The Chemical Age

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Notes and Comments

Chemical Industry and the Empire

SELDOM if ever before has an Empire Number made its appearance in such timely circumstances as those which attend to-day's issue of THE CHEMICAL AGE. The Imperial Conference which is to open at Ottawa next week will mark an epoch in the history of the British Commonwealth of Nations, and will, it is confidently expected, crystallise in concrete form the dreams and aspirations of generations of British statesmen who foresaw an Empire welded together not only by ties of sentiment but by the more solid, real and enduring bonds of economic co-operation. Already we in the chemical industry have been thinking imperially during the past week, for new links between the members of the industry have been forged at Nottingham, where the Society of Chemical Industry, whose members are distributed over the four quarters of the Empire and whose local sections and sub-sections operate in some of the more important of the Dominions, has been holding its fifty-first annual meeting, extended references to which appear in other pages.

The British nation has built great hopes on the Ottawa Conference, and the chemical industry looks forward to its deliberations with exceptional interest. Since the last Imperial Conference was held two years ago the depression, which some then hoped and believed would before long pass away of itself, has spread to all the countries of the world, including those which regarded themselves as safely isolated from its influence, and has deepened until it now threatens the economic basis upon which our modern civilization is built. When it was decided that the Empire Governments should renew in Ottawa the efforts to promote trade within the Empire which had failed in London, it was not dreamed that developments in the meantime would make that task so overwhelmingly urgent as it is to-day. The delegates to the Conference have to shoulder a great responsibility, not only to the Empire but also to the rest of the world. So far every country has sought to save itself from the consequences of the breakdown of international trade by measures which, though they may have been partially successful so far as its own internal position is concerned have only made the general position worse. It is scarcely an exaggeration to say that up to the present, with the exception of the agreement between Holland, Belgium, and Luxemburg for mutual progressive tariff reductions, every step taken by every country to improve its own economic position has increased the difficulties of every other, with inevitable boomerang effects. At the Ottawa Conference governments representing a quarter of the world will discuss how each can best help the others, and how they can most usefully co-operate in promoting their common recovery. If they are successful they will give a lead which others will be quick to follow. And, apart from the value of the example thus set, a revival of economic activity throughout the British Empire will stimulate trade in every part of the world and contribute effectively to the general recovery.

Future of the Industry

ALL eyes are on Ottawa, including those of the chemical industry, whose own particular hopes and aspirations are set out in other pages of this issue. The industry is equipped and ready for the release from depression which imperial and international decisions have the power to initiate during the present eventful year. The after-war period has, in spite of handicaps, been a time of continuous activity leading towards definite objectives which are broadly in line with the opportunities which may well open out if the international monetary situation can be adjusted. In his presidential address to the Society of Chemical Industry last year Sir Harry McGowan put forward the suggestion that there was urgent need for a general staff for British industry in which industrial labour, financial, economic and marketing experts would survey our national position, mobilise and plan our efforts and give to our knowledge, skill, and ability a co-ordinated strength far greater than that attainable by our present individualistic efforts. The chemical industry, which depends for its prosperity on the commercial efficiency of hundreds of manufacturing units which use its products, must therefore look forward hopefully to the conscious planning of industry on a wider scale than exists to-day.

The chemical industry has been brought up to a standard comparable with that of other nations. Its research workers are making steady progress with new manufactures, and the fact that new products create new markets will not be forgotten. Its organisation, although much remains to be done, has advanced far enough to enable the swiftly changing technical and economic positions to be followed by production on a rising scale as soon as world trade conditions are brought back to health. Its future lies in the organising genius of the British nation, which, although it is slow to get going and is perhaps hampered by too narrow an individualism, is based soundly enough on common sense and practical experience to ensure that in the long run our principal industries are re-established on a scale which will approximate to their former pre-eminence.

The Nottingham Meeting

THOSE members of the Society of Chemical Industry who had been privileged to participate in any of the three previous annual meetings held at Nottingham looked forward with every confidence to a participation in a varied and attractive programme at the fifty-first annual meeting held there this week, and they were certainly not disappointed. Although, in point of numbers, the attendance was somewhat below that of recent years, the meeting was a highly successful one from every point of view, and the officers and members of the Nottingham Section well deserved the vote of thanks accorded to them for their hospitality, to which were rightly added expressions of gratitude to the civic heads of the city, the University authorities and the heads and members of the firms whose works the member's had the opportunity of inspecting in the course of the week.

The annual report presented on Wednesday morning reflected the conditions associated with the prevailing depression in industry, with its attendant reduction in occupation in conjunction with unusually heavy taxation, the membership having shown a net reduction of 131 in the past twelve months. Some satisfaction may, however, be found in the fact that the number of new members elected during the year exceeds that of recent years—a hopeful sign which will be more fully appreciated when those who, as a measure of economy, have temporarily withdrawn their membership rejoin the ranks with the return of prosperity. Financially, the Society has had a difficult year, for despite rigid economy and the cutting down of expenditure by some £1,340, the treasurer was left at the end of the year with an adverse balance of £486.

Professor Morgan's Address

PROFESSOR G. T. MORGAN'S presidential address was an inspiration, both in its analytical review of the past half century's history of the Society's development and in its examination of the intricate problems of unification of interests among chemical organisations. The Society owes its present position in a large measure to the system of local sections and definite subject groups which gives the rank and file member a more direct personal interest in the Society than would be possible with a single unit. This factor in itself is one which must receive due consideration in the contemplation of any scheme for the linking up of kindred organisations. Professor Morgan has discovered that 14 chemical organisations have an aggregate membership of 23,605 with a combined subscription list of £46,555, or about £2 per member per annum, of which 55 per cent. is spent on the " benevolent supervision and official administration " afforded by what he aptly describes as " our chemical civil service." Officialism, as he points out, is not peculiar with chemical circles, but extends to all spheres of human activity.

Professor Morgan asks: " Is it desirable that any simplification should be made in our methods of chemical governance, and if so, how may we introduce favourable modifications with our prevailing practices? " And he proceeds to answer the question in the affirmative, setting out many desirable lines upon which his object might be achieved. What is required, however, as in the case of the wider sphere of politics, is a change of heart and a revolution of ideas on the part of the governed. Professor Morgan urges each of the various organisations to see how far it might re-organise itself to the public good of all the other chemical bodies. In any change that may ensue it is desirable that the individuality and goodwill of each society should be perpetuated to the utmost extent compatible with a general scheme of union.

Lausanne

THE National Government is on the top of its form. Last week the dead weight of a five per cent. upon the money world was removed almost by a stroke of the pen. This week, Reparations are finally abolished. Thus two big steps along the road to recovery have to be recorded, and two of the most difficult which faced the new Government. The Reparations story is simple and interesting if stripped of all its details and told in brief outline. Thirteen years ago, having passed through the long course of intensive war propaganda and reached the mentality represented by hanging the Kaiser and squeezing the lemon until the pips squeaked, we made the Treaty of Versailles. The late Sir Sidney Low holds the record for a calculation that Germany could pay £250,000,000,000. That mentality has through thirteen years of suffering and disaster gradually disappeared. In the meantime thirty-five conferences and committees of experts have met, and the Reparation figure comes down to a nominal £200,000,000. The politicians, therefore, through thirty-five conferences, have undone their own folly at the rate of £7,000,000,000 a conference. As to the £200,000,000 now left on the account, the admiration of the business world will be extended to the wonderful political camouflage employed in this final act of statesmanship. The £200,000,000 is not called Reparations, but compensation for giving up the Reparation idea. It is not to be paid to the victors, but to the Bank of International Settlements for the purposes of European reconstruction. The Bank is not to collect the money for three years, and then only if it can be done without affecting the German exchanges. Interest is only to be paid when a collection, that will never be made, has been reported, and if these unlikely transactions are not completed within fifteen years, the whole scheme is wiped out. It would undoubtedly be quite impossible to find any money market in the world that would give to-day 10 per cent. of the nominal value of these Lausanne bonds, and Reparations is in this way reduced to something less than a few week's cost of our own dole. Altogether a pretty story with a happy ending.

It is, of course, not mainly the wiping out of fictitious political figures which interests us. The reactions and repercussions that follow are the important things. These Reparations have held up commercial transactions; commercial and business finance on the Continent has been brought to a standstill while Reparations blocked the way. We may now look for a steady cancellation of all the restrictions of exchange, now no longer necessary. The Lausanne agreement contains some useful references to trade barriers, and pious hopes of their removal, references which we trust will be carefully studied at Ottawa. With Reparations out of the way the statesmen will now proceed to tackle intergovernmental debts.

Annual Meeting of the Society of Chemical Industry

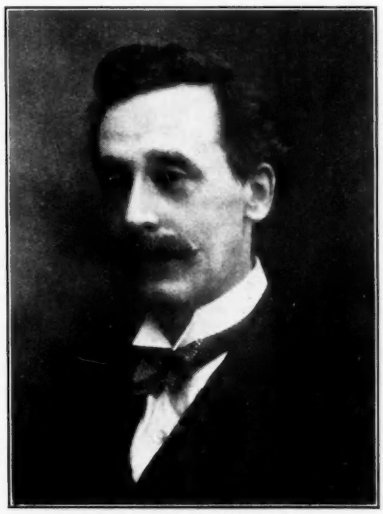
Professor Morgan on Prospects of Unification

THE fifty-first annual meeting of the Society of Chemical Industry was held at Nottingham from Tuesday to Friday this week, under the presidency of Professor G. T. Morgan. Although the total attendance was slightly below the average of recent years, the quality of the programme was well up to the Society's standard, and reflected credit upon the officers and members of the Nottingham Section, who were responsible for the arrangements. Professor Morgan delivered his presidential address on Wednesday morning, and Sir William Pope, after receiving the Messel Medal on Thursday morning, delivered his Messel Memorial Lecture on "Forty Years of Stereo-Chemistry."

ON Tuesday evening the members and their ladies were received by Lord and Lady Trent in the Great Hall of University College, University Park, Nottingham. This building, which was opened by the King and Queen in 1928, forms a fitting memorial to the late Lord Trent (formerly Sir Jesse Boot), whose gifts to the people of Nottingham, in the aggregate, have been estimated at about one million pounds.

On Wednesday morning the members assembled again in the Great Hall at University College, where the Lord Mayor of Nottingham (Alderman W. Green), and the Principal of the College (Principal Hugh Stewart) extended to them a cordial welcome.

The LORD MAYOR, in the course of his address of welcome, said he wished to make their welcome particularly cordial, because he believed that the body of people represented by this organisation had done more for the welfare of this country than had any other organisation in existence, although others were doing important work. He trusted that the pooling of their ideas and opinions would be to the everlasting benefit not only of Nottingham, but to themselves and the country in general.



Professor G. T. MORGAN
President of the Society of Chemical Industry, 1932

Principal STEWART, on behalf of the authorities and members of the College, supported the Lord Mayor's expression of welcome. It was singularly appropriate, he said, that the Society should hold its conference in buildings and in surroundings which were the creation of a very notable figure in chemical industry. They represented but one of the many princely gifts which the late Lord Trent had bestowed upon the city, but it was the most notable and the most inspiring of all.

The PRESIDENT, proposing a vote of thanks to the Lord Mayor and Principal Stewart, assured them that the members of the Society had been looking forward with pleasant anticipation to this visit, having in mind the fact that the Nottingham Section had already on three occasions been the host of the Society. The first annual general meeting held in Nottingham took place in 1890, under the presidency of Sir Lowthian Bell. The next Nottingham meeting was in 1898, under the presidency of Professor Frank Clowes, of University College. On that occasion the Society's Medal was awarded to Sir William Perkin, who discovered mauve—the first synthetic colouring matter. The third visit was paid in the eventful year, 1914, under the presidency of Dr. Rudolph Messel, and on that occasion the Society's Medal was bestowed on the first president, Sir Henry Roscoe. The local leaders of chemical industry had constantly shown their practical interest in the Society by serving as chairmen of the Nottingham Section, and the Society was proud to include the present chairman of the Section, Lord Trent, in that illustrious list. A similar close collaboration in scientific pursuits linked the Society with University College. The first chairman of the Nottingham Section was Professor Clowes, the former president. The College had given the Society many other worthy supporters, including Professor Kipping, Dr. Prideaux, and Dr. Firth.

The Annual Report

The PRESIDENT presented the annual report, which showed that the members on the register numbered 4,410, as compared with 4,541 on July 14, 1931, a reduction of 131. The report states that while the loss in membership is serious it is much less than the Council anticipated at the beginning of the year, and is proportionately a much lighter loss than most scientific societies have suffered in the same period. The number of new members elected exceeds that of recent years, and is a hopeful sign which will be more fully appreciated when those who, as a measure of economy, have temporarily withdrawn their membership, rejoin the ranks when general prosperity returns.

The president, Professor G. T. Morgan, who retired after the annual meeting, completed a year of office associated with strenuous and successful endeavour in the Society's interests. He visited many of the local sections, contributed notably to their programmes, and represented the Society on many occasions among the kindred societies and institutions. The Council nominated as his successor, for the year 1932-33, Dr. Robert H. Pickard (a vice-president of the Society, a former chairman of the Manchester Section, and Director of the Shirley Institute of the Cotton Research Association). Dr. R. T. Colgate has again been elected by the Council as hon. treasurer, and Dr. E. F. Armstrong has been re-elected hon. foreign secretary. The latter is making a visit to the Sections in Canada this month.

The four retiring vice-presidents are Dr. A. D. Little, Mr. William Macnab, Mr. L. Guy Radcliffe and Mr. Edwin Thompson; none are eligible for re-election. To fill the vacancies the Council nominated Professor G. T. Morgan (retiring president), Dr. J. A. Cranston, Dr. A. E. Dunstan and Mr. Geo. Gray. The vacancy among the vice-presidents, due to the elevation of Dr. Pickard to the presidency, has been filled by the election of Lord Trent. Dr. A. E. Dunstan, Mr. C. J. Goodwin, Dr. J. P. Longstaff and Mr. B. G. McLellan were the retiring ordinary members of Council, and were not eligible for re-election. The vacancies were filled by Mr. Horatio Ballantyne, Dr. J. T. Dunn, Dr. E. D. Mason and Mr. J. Davidson Pratt.

Reports from all centres recorded increased attendances at local section meetings. A satisfactory feature of the session has been the large number of meetings arranged jointly with other local bodies, a notable step towards rational co-ordination. The Council holds the opinion that the formation of subject groups within the Society should be encouraged in all cases where a well-developed branch of applied chemistry is not already adequately served by a strong society. It is hoped that a fuller application of these measures will check the wasteful multiplication of specialist societies and may have a definite tendency towards unification of existing bodies. With these objects in view, two new groups, dealing with food and plastics respectively have been formed.

The full development of the plastics group, it is stated, has been delayed by negotiations for amalgamation with another body believed erroneously to have similar aims. Rapid progress is being made under a representative provisional executive, of which Mr. H. V. Potter is chairman and Mr. A. Lowe, hon. secretary. A programme for the 1932-33 session is developing.

The Chemical Engineering Group, the senior subject group of the Society, has completed its twelfth year of existence with unimpaired vigour. During the year the Fuel Committee has not organised any special public meetings of its own, but has maintained contact with the local sections respecting their programmes. The committee's advice was sought and given on appropriate subjects and authors. The

utmost consideration is being given to the proposed Advisory Council on Fuel. It has been recommended that the work of the Tar Testing Committee shall, in future, be carried out by the British Standards Institution.

Jubilee Lectures

The experiment made last year of appointing two special jubilee memorial lecturers to address several of the local sections in turn proved successful. In each case the lectures delivered by Professor Morgan and Dr. Dunstan attracted large audiences. During the coming session Dr. E. F. Armstrong's lecture on "Alcohol through the Ages" will be delivered at Birmingham, Leeds and Bristol; and Dr. G. D. Bengough will lecture on "The Corrosion of Metals in Salt Solutions and Sea Water" in London (jointly with the Chemical Engineering Group), Glasgow (jointly with Edinburgh), Manchester (jointly with Liverpool), and Newcastle-on-Tyne.

The Society has received an invitation from the Newcastle Section to hold the annual meeting at Newcastle in July, 1933, and the Council proposes to accept this on behalf of the Society.

The PRESIDENT, in referring to the Society's losses by death, made reference to the death of Sir Richard Threlfall, which had occurred only last Sunday. Sir Richard was for many years a staunch supporter of the Birmingham Section, and was the Society's Medallist at the Manchester meeting three years ago. Sir Richard had done great work for chemical industry both in peace and in war, and at the memorial service held on July 12 the Society was represented by the president and Mr. George King.

Referring to the John Gray Jubilee Scholarship (mentioned in the report), the president stated that the Council had received that morning a report from Professor J. W. Cobb, of Leeds University, concerning the work carried out during the past session by Mr. G. Alan Thompson, the first John Gray Jubilee Scholar. Mr. Thompson had presented a thesis and had gained a B.Sc. Degree of the Second Class, and Professor Cobb had added that it was a very good second class.

There was no discussion of the report, and on the motion of the president, seconded by Mr. L. Anderson (a vice-chairman of the Nottingham Section), it was unanimously adopted.

The Society's Financial Position

Dr. R. T. COLGATE, hon. treasurer, presented the balance sheets of the Society and of the Messel Fund, the Leonard Bequest, the John Gray Jubilee Scholarship Fund, the Chemical Engineering Group and the Bureau of Chemical Abstracts. He recalled that last year he had sounded a note of caution, for it had been quite clear then that the Society had not arrested either the decline in the main sources of revenue. In the year under review the income from subscriptions was reduced by £605, and advertisement revenue had decreased by £1,370, but expenses had been reduced by £1,340. Even that, however, was not sufficient, and the adverse balance at the end of the year was £486. This year, however, the Society had not had the interest from the Leonard Bequest, but that had been reinvested and added to capital account, awaiting the time when it could be applied in the way in which it was intended to be applied by Mr. Leonard. That would make the deficit look somewhat better. The policy of the Council and the Finance Committee was to spend the whole of the income each year on the members' service, as far as possible. Fortunately, in recent years the Society had been able to do this, and to leave quite a comfortable margin on the right side, and that margin was quite sufficient to look after the deficit experienced this year.

The accounts of the Chemical Engineering Group were satisfactory.. They showed an excess of expenditure over income of £14, but they carried the cost of the exhibition of research instruments and apparatus at the jubilee celebrations last year. The Group and its hon. treasurer, Mr. F. A. Greene, were to be congratulated on the excellent results achieved. Viewing the accounts as a whole, Dr. Colgate regarded the position as reasonably satisfactory, considering the industrial situation.

Dr. E. B. R. PRIDEAUX, seconding the adoption of the accounts, said the Society was continuing to preserve its tradition of service to members and to chemical industry in general, and to the general public, in the way of education. In order to do this it was using its resources of annual income to the utmost extent.

Dr. R. H. PICKARD, president-elect, proposing a vote of thanks to the officers of the Society for their work during the past year, said that the Society was perhaps unique among scientific bodies in the country in that it had developed a strong local interest in the various sections, and he included in this expression of thanks, therefore, the local secretaries, and the permanent officials of the Society.

The vote of thanks was seconded by Mr. F. A. GREENE, and carried with acclamation.

Mr. GABRIEL JONES, late general secretary of the Liverpool Section, and who has been nominated for the chairmanship, and the president, responded.

Presidential Address

Professor G. T. MORGAN, in his presidential address on "Ourselves and Kindred Societies," gave a historical review of the growth and development of the Society, with its local sections and subject groups, during the past fifty years, and examined the present-day conditions of some 14 kindred societies which have for their object the furtherance of the professional and scientific welfare of chemists.

In 1930 these 14 societies, he said, had a total membership of 23,605 and their combined income from subscriptions was £46,557, so that the average annual subscription per member was roughly about £2. The figure for total membership has no personal significance since it manifestly represents a stage army in which many individuals each play several parts.

With, perhaps, two exceptions the associations under review have as their most important function the publication of scientific literature of interest to chemical readers who may be either members or non-members of the respective societies. From sales of publications, the 14 societies derive an income of £19,380 and from advertisements they receive the substantial sum of £13,300, making a total of £32,680. On the other hand the gross expenditure on publications is £49,000 so that on this important function there is a loss of £16,320, but this is only a book-keeping item which means that on an average 13s. per member has to be earmarked from the subscriptions of some 23,000 members in order to meet this deficit. In other words, out of an average subscription of £2 each member pays about 13s. for his scientific literature. Salaries of administrative staffs amount to £16,000 and general office expenses to £10,900, giving a total of £26,900, or about 22s. out of the average subscription of £2. The remaining 5s. are accounted for by the cost of sectional and general meetings amounting to £3,660 and by library expenses which approach £3,000 per annum, an item of expenditure which is mainly borne by the Chemical Society with a contribution of £2,360. Expressed in percentages, the average annual subscription is divided as follows: 32.5 per cent. for scientific literature, 6.5 per cent. on social amenities, 6.0 per cent. on library facilities, and 55 per cent. for benevolent supervision and official administration

Two general tendencies are indicated: first, that a considerable proportion of a chemist's subscription goes in administrative and office expenses; secondly, that the essential task of supplying to British chemists a complete epitome of chemical progress in the form of Transactions and Abstracts is becoming an intolerable financial burden to those societies which undertake the major part of this vital function. If any economy could be effected on administration, some of this saving should go to the relief of publication, while the remainder might tend to a general lowering of the rates of subscriptions. Moreover, reunion of certain chemical associations might eliminate some subscriptions altogether.

The Economic Aspect

Reunion of the main chemical associations would effect economies in administration and would give a better and more comprehensive service of chemical publication, but the advantages of consolidation are not entirely restricted to material benefits. A united profession should lead to greater manifestation of the corporate spirit and pride of craft. Chemists are sometimes exhorted to express themselves more audibly and forcibly on social and political topics of the day. It is, however, scarcely likely that our views on public matters will generally command attention as long as we are repre-

sented by so many different professional and technical associations. Our rulers, who are rarely, if ever, scientific, are mystified by this complexity, and find in our division sufficient excuse for disregarding our suggestions. Yet there are many matters on which the considered opinion of chemists would be of public utility.

The time is ripe for a systematic study of the material resources of the British Empire, and this task is mainly a chemist's job. Many of the natural products of the dominions and dependencies are in need of intensive chemical investigation. To carry out such researches in a thoroughly effective and comprehensive manner needs the expert organisation which could be best supplied by a central body fully representative of British chemistry. Every branch of chemical science would have an essential part to play in this great undertaking.

Dr. F. H. CARR, past-president, moved a vote of thanks to the president for his valuable and inspiring address, dealing with a matter of fundamental importance not merely to the Society, but to the whole of the English-speaking world of chemists and all engaged in chemical industry.

The vote of thanks was carried with acclamation, and the PRESIDENT briefly responded.

On the motion of the PRESIDENT, a vote of thanks was accorded the authorities of University College for the arrangements they had made for the convenience and comfort of members of the Society during their stay at Nottingham.

Wednesday's Luncheon

The members and their ladies were entertained to luncheon in the Refectory at University College on Wednesday by invitation of the chairman and committee of the Nottingham Section, when Lord Trent presided, accompanied by Lady Trent.

Dr. R. T. COLGATE, hon. treasurer, proposed a toast to the Nottingham Section, and took the opportunity of expressing thanks to them for their hospitality, and paid a particular tribute to Lord Trent, the chairman, and to Mr. W. T. T. Ainsworth, the hon. secretary. Lord Trent, he said, had played not a small part in building up an immense industrial concern, at once an asset to the country and to the city of Nottingham, and he brought to the Society's meetings a wealth of experience.

Lord TRENT responded to the toast.

Dr. J. T. DUNN, the retiring chairman of the Newcastle Section, referred to the invitation which that Section had extended to the Society, and which the latter had accepted, to hold the annual meeting in Newcastle next year. He assured the members of a cordial welcome there.

Messel Memorial Lecture

Sir WILLIAM POPE, who was presented with the Messel Medal on Thursday morning, devoted his Messel Memorial Lecture to a review of "Forty Years' History of Stereochemistry." He dealt principally with the developments that had taken place as the outcome of the work done on optical activity by Pasteur up to about the year 1860 and recounted the changing views that had arisen in the past forty years regarding the shapes of the molecules of which organic substances are composed. Many of the views which Pasteur had enunciated, he said, have been solved by methods the main lines of which he himself sketched out. But just as a fresh outburst of expansion followed on the Van't Hoff-LeBel theory of the asymmetric carbon atom in 1874 and a further era of progress commenced in the early 90's, so we are again witnessing the opening of a new epoch in the evolution of stereochemistry. The classical stereo-chemistry based on Pasteur's work will continue to expand but it is becoming merged in a larger stereo-chemistry which embraces all chemical substances whether optically active or not.

Progress in X-Ray

The rapid expansion of modern physics during recent years has provided novel and powerful methods for determining the arrangement of the atoms, and indeed of the components of the atoms, in solid, liquid, and even gaseous substances. Chief among these new methods is the determination of the X-ray diffractions of the elements and their compounds; others involve the measurement of dipole moments and the quantitative study of the behaviour of thin films only a few molecules in thickness. The results which have been thus obtained in most instances confirm in a surprising way the accuracy of the constitutional formulæ assigned to organic compounds by the chemist; it is noteworthy that when discrepancies have occurred the more careful application of the physical method has generally resulted in the vindication of the chemist.

So far, the new methods are only capable of confirming the correctness of a constitutional formula which is advanced by the chemist; that is to say, the X-ray analyst has not yet succeeded, in any single instance, in determining the constitution of an organic compound without being told beforehand what the constitution really is. This state of affairs is, of course, only transient and we may look forward to such improvements in technique as will convert the novel physical methods for the investigation of stereo-chemical problems into much more searching weapons for the determination of molecular configuration than any formerly at our disposal.

Here and There

The remainder of our report of the meeting, including the annual dinner, which was held at the Mikado Restaurant on Thursday evening, will appear next week.

The past year's net decrease of 131 members compared with net decreases of 61 in 1927-28, 98 in 1928-29 and 55 in 1930-31, the figures for 1929-30 showing a slight increase of 46.

The death of 36 members during the past twelve months was recorded in the annual report. Among these were two original members of the Society—Mr. P. G. W. Typke and Professor W. F. Reid.

A civic reception was held in the Nottingham Council House on Wednesday evening by the Lord Mayor and Lady Mayoress, Alderman and Mrs. W. Green. The reception was followed by dancing and refreshments.

During the business sessions Professor Morgan wore for the first time the presidential chain of office presented by a large number of contributors to the expense of last year's jubilee meeting held in London.

Fifteen excursions were arranged for Thursday and Friday, of which 13 were visits to industrial works around the city and two were purely pleasure trips—one through the Dukeries, visiting Welbeck Abbey, by kind permission of the Duke of Portland, with tea in the riding school, and the other to Newstead Abbey. Lord Byron's ancestral home.

Mr. H. Calam was mainly responsible for the excellent conference handbook issued by the Nottingham Section for the guidance of the members throughout the meeting. In an introductory note Mr. Calam acknowledged the indebtedness of the committee to the civic heads of the city and to the heads and members of the firms whose works were visited.

Following the luncheon at the University College on Wednesday, there was a reception in the Great Hall by Alderman E. Huntsman, chairman of the College Council, and Principal Stewart, principal of the College. The visitors made an informal inspection of the College departments and were afterwards entertained to tea by the College Council.

Exports of Alkalis from Russia

EXPORTS of alkalis (soda) during the first half of 1930 and 1931 were as follows for the respective products in metric tons; Soda ash 2,446 and 18,783; caustic soda 3,950 and 16,813. During the first half of 1931, 2,546 tons of sodium peroxide exports were also included in the official Russian statistics and the respective tonnage for the entire group were to the following countries, Great Britain 1,790; Argentina 6,765; Germany 12,150; Netherlands 635; Greece 1,914; Denmark 1,008; Egypt 617; Italy 752; China 202; Latvia 880; Lithuania 267; Norway 633; Persia 75; Poland 656; United States 324; Turkey 393; Sweden 489; Estonia 649; and Japan 5,981.

Works Visits In and Around Nottingham

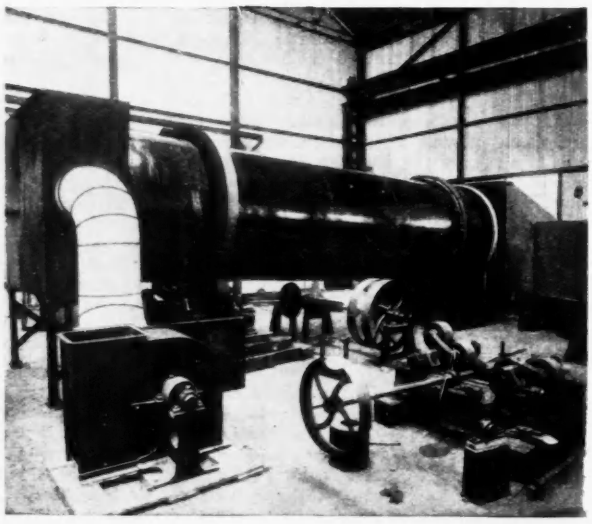
A Survey of Midland Industries

THE industrial activities of Nottingham and the surrounding districts, coupled with the enterprise of the Local Section, which was responsible for the compilation of the programme, provided the members of the Society of Chemical Industry who attended the fifty-first annual meeting this week with unique opportunities for visits to a large number and variety of modern works. The following notes, compiled from information specially supplied to THE CHEMICAL AGE by the firms concerned, summarise the week's itinerary.

Chemical Plant Manufacture

The visit to the Bloomsgrove works of Manlove, Alliott and Co., Ltd., was one of the most popular of the series because of its close association with the activities of the chemical industry. The works covers eleven acres and employs many hundreds of hands, and it is a source of peculiar satisfaction in the prevailing conditions to note that full-time is being worked. Formed in 1837 to carry on the business of the older Centrifugal Co., the company established the Bloomsgrove works for the manufacture of hydro-extractors, and since that time the business has steadily grown until to-day it produces a wide range of equipment for the chemical and allied industries, including filters for solvents, clarification of liquids and general filtration purposes, centrifugals for use in chemical works, sugar factories, oil mills, etc., dryers, evaporators, filter presses, mixers, film dryers and plant for the extraction of oils.

Every month a designers' conference is held at the works, at which new suggestions for the improvement of existing types of machines are laid before the management and thoroughly examined and discussed. Although the patterns and types of machines are changed only at definite intervals, the work of investigating the possibilities of improvement is going on all the time. The visit included an inspection of the whole process of manufacture, from the drawing office, pattern shops, foundries, boiler and erecting shops, to the test rooms. The final test is that of the completed machine under working conditions. Every machine is subjected to careful and exhaustive tests before being released on to the market or sent to the customer's works. Features of special interest were the manufacture of "Easifilt" vertical leaf filters, the new "Filtrall" enclosed pressure leaf-filter, the "Weston" centrifugal, and dryers of the rotary and the "Johnstone" vacuum and non-vacuum types.



Rotary Dryers in course of erection at Bloomsgrove Works.

Chemical Processes in Cycle Manufacture

The development of the Raleigh Cycle Co., Ltd., whose works were visited on Friday morning, ranks as one of the industrial romances of Great Britain. It epitomises the history of the British cycle and motor cycle industry, which, through enterprise, adaptability, invention and painstaking organisation, has become one of our few post-war industrial triumphs. Established 43 years ago, before the application of the internal combustion engine to road traction had been thought of, it has always been in the van of progress, and has grown to a solidity which has made it the leader of the cycle industry. Of greatest interest from a chemical point of view is the electric plating department, where the articles are "glazed" to a fine finish, chemically cleaned in an electric cleaner, rinsed in water, passed through an anodic cleaner, washed in running water and taken to the nickel plating vats. Solutions containing double and single salts of nickel, along with a proportion of conducting salts, are used, and there are two types of nickel plating vats, (*a*) those in which the solutions are agitated and working at 250/300 amps., and (*b*) still vats, in which the articles are not moved or only slightly moved with end to end motion. After all traces of the last plating solution have been removed, the articles are dried and polished to a high degree of reflection before passing into the chromium plating department. The solution used here is of fairly universal application, being chiefly composed of chromic acid, and the anodes are of rolled antimonial lead. The enamelling department presents other aspects of the application of chemical processes.

The heat treatment plant is an up-to-date department consisting of oil-fired carburising and reheating furnaces, working on the continuous charging and discharging principle, the work being quenched in oil or water as designed, the quenching fluid being kept cool by central water and oil coolers returning the cooled liquid to the quenching tanks. There are also several cyanide and salt baths for skin hardening and reheating purposes, and a new type gas fired rotating barrel carburising furnace, in which suitable articles cn be carburised and quenched efficiently and rapidly. This cuts out the necessity of packing in pots, the carburising being obtained by ammonia gas and carburising oil.

Blast Furnaces and Chemicals

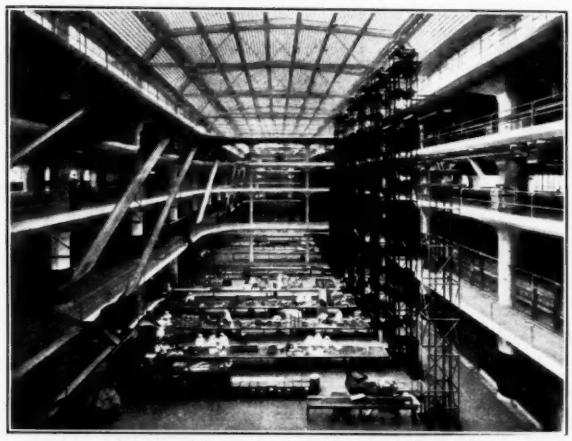
A large party of members visited the works of the Staveley Coal and Iron Co., Ltd., whose foundries have recently been added to by the erection of modern plant for the manufacture of cast iron pipes by a patented process. The blast furnace plant consists of four furnaces with a nominal weekly output of 4,400 tons of pig iron. The present coke oven plant comprises 100 Simplex type waste heat ovens and 70 regenerative type ovens. In the extensive by-product plant, the coke oven gases are subjected to cooling and washing processes for the recovery of tar, ammonia, benzol, etc. There is also a recovery plant for extracting benzanoid bodies entrained in the tar acids during the washing process. Tar distillation was commenced in 1912, the original plant having a capacity of 300 tons of tar per week. The present plant consists of six 20-ton stills with dehydrator attached, with a distillation capacity of 1,000 tons of tar per week.

The acid plants consist of two units of chamber plant for making sulphuric acid, with a total output of 500 tons of B.O.V. (78 per cent. H_2SO_4) per week. The oleum plant is of the Manheim type, burning pyrites as the source of sulphur supply. The nitric acid plant consists of four 2-ton capacity stills, gas fired, with the necessary condensing and storage units, and has a capacity up to 16 tons of 95 per cent. HNO_3 per day. This plant was erected in 1915. Nitration of benzol has been carried out at the works since 1915, but the present plant was erected in 1923 and consists of twelve nitrators with washing and distillation plant, having a potential output of 100 tons per week of nitrobenzol.

There is an extensive electrolytic soda plant, and the works are equipped with a modern boiler and power generation plant and up-to-date laboratories. The laboratory staff is now well over 40 strong and the laboratories are among the best appointed in the country.

Drugs, Pharmaceuticals and Soap

Situated alongside the London, Midland and Scottish Railway at Beeston, about four miles from Nottingham, the new Beeston works of Boots Pure Drug Co., Ltd., show in process of development a far reaching scheme planned on modern lines, and at the time of the conference one could watch the interesting stage of bringing into production another large unit. The site belonging to the firm covers



Part of the New Factory for Boots Pure Drug Co. at Beeston.

approximately 264 acres and besides its excellent railway facilities has one of the new arterial roads planned to run along its borders. In the attempt to plan and operate all the production departments of the firm, as a co-ordinated whole, progress has been made at a rapid rate. During the past three years development has been pressed forward so that on the Beeston site soap works are now in regular production. The power house, with a capacity of 105,000 lb. of steam per hour, is in regular operation, and the large unit designed for the manufacture, packeting and distribution of the pharmaceautical, medicinal and toilet preparations in liquid or paste form, is practically completed and its various sections are in process of being started up.

The dimensions of the present section, which is about one third of the final building contemplated, are 380 ft. wide and 600 ft. long. A feature of special interest is the complete equipment for bulk storage of liquids. A large basement assigned for this purpose is fitted with containers specially constructed for the particular products they are to hold. Research work has been carried on over a series of years to ensure that the most suitable construction material is used in each case. Copper, aluminium, mild steel, austenitic stainless steel, glazed earthenware and glass lined steel are all called into use. The stainless steel tanks are of special interest as each one bears upon it a plate giving its full history. The tanks were built to the firm's own specifications and every plate was passed by the firm's analysts. The administrative offices, canteen and analytical laboratories are housed on the front of the building. The canteen has accommodation for upwards of 1,000 persons. The analytical laboratory is completely fitted in teak. It is 380 ft. in length and is of sufficient height to carry a gallery which runs the whole way round it. The receiving and dispatch docks each run the full length of the building and are served by both rail and road.

Motor Car Construction

The Rolls-Royce works at Derby were opened in 1907, the 40/50 chassis then being the exclusive manufacture, the works at that time covering about 1¼ acres. At the present time the works covers approximately 26½ acres, the manufactures being 20/25 h.p., 40/50 chassis, and Kestrel and Buzzard aero engines. The number of employees is now over 4,000. The foundries are capable of dealing with the whole of the firm's requirements. The RR. aluminium alloy, known as "Hiduminium," is largely used, in both sand and die castings. Numerous castings are also made in phosphor bronze alloy. The cylinder castings for the chassis engine are produced from a special iron alloy in the department devoted to cast iron. The foundries work in close co-operation with the metallurgical laboratory and the material testing department. The forge shop produces a large percentage of the total forgings required, which are made from steel obtained to definite specifications from the steel producers, each vital component having an individual test piece forged with it.

Heat treatment is carried out in a specially appointed department, nearly every metal component passing through this department at some stage of its manufacture. The machine shops are equipped with modern and special machines in conjunction with carefully designed jigs and tools. An extensive and specially equipped experimental department is maintained, where development and research work is continually being carried out, and which enables Sir Henry Royce to have his designs thoroughly tested before they are passed for production, and are embodied in the current production. Every part, however small, having any bearing on the performance or reliability of the car is tested for a minimum of 10,000 miles at high speeds over indifferent roads in France.

Lace Finishing

The lace industry, for which Nottingham is deservedly famous, was studied at the works of Birkin and Co., Ltd., founded by the late Mr. Richard Birkin in 1825. In 1828 the founder accomplished one of the most important developments in perfecting machine-made laces, *i.e.*, in adding perfect purl edges, the purl prior to that date having been stitched on. Since that time, the firm has developed into the largest fine fancy lace manufacturing houses in the country.

Every process from the winding of the material, usually fine cotton or silk thread, up to the stage at which the article is complete and ready for the market, is carried out at the New Basford factory and the Broadway warehouse of the company. These processes comprise draughting and designing, wood and brass winding, threading, warping, making of lace on the machine, mending, dyeing, staining or scouring, dressing, drawing, clipping, measuring, carding and boxing. In 1899 the company purchased for this country the patents for a circular lace machine, the result of a French invention, which enabled an exact reproduction of hand-made lace made by machinery to be put on the market for the first time, the threads being manipulated by machines in the same manner as by hand workers. From time to time this machine has been improved and several new patents have been taken out by the company in recent years.

Hosiery Manufacture

The programme included two visits to the works of J. B. Lewis and Sons, Ltd., hosiery manufacturers, at Haydn Road, Nottingham. Chemistry enters only to a minor degree in hosiery manufacture, the operations being chiefly mechanical, with the exception of the dyeing and scouring operations by outside firms. A chemist is retained for analysis of the various materials used. The raw material for "Meridian" underwear is a very fine specially spun cotton yarn. It is received on the cops just as it comes off the spinning mule and over 600,000 miles per week are used. The first operation is winding. Here the yarn is run from the small cops on to large cones, suitable for the knitting machines and at the same time all lumps and faults are taken out. One of the cones holds something like 30 miles of yarn. The cones then go to the special knitting machines somewhat on the same principle as hand knitting but in place of an ordinary knitting needle there is a special hooked latchneedle for every loop. There being about 2,500 of them in the circle of one machine, a machine makes about half a million loops per minute.

Apparatus is fitted to the machines to stop them when a thread breaks or a hole occurs and they are made in sizes to produce the tubes of web just the correct widths for cutting the various garments. The tubes of web are then examined for faults, repaired where necessary and then stored in sizes. The cutting out of the garments to the various shapes required is done by hand and the garments then pass to the machines which put on the rib cuffs and stitch the garment into shape. The seams are then covered by a third machine. The garments are next inspected, and then proceed to the making-up section. In the pressing and folding sections they are laid on padded tables and steam blown through them to take out all creases, etc. They are given a thorough examination, folded, packed and stored ready to fill the orders as they arrive.

Cigarette Manufacture

The production of cigarettes is one of the staple industries of Nottingham, and the visit to the works of John Player

An exterior view of the new John Player's cigarette factory

and Sons (a branch of the Imperial Tobacco Co., Ltd.) was of particular interest in view of the approaching completion of what is described as the largest and most modern cigarette factory in the country. The new building is 500 ft. long, 66 ft. wide and 85 ft. high. No fewer than 3,000 tons of British steel and 50,000 cu. ft. of Empire stone have been used in the construction of the factory, which has a floor area of 220,000 sq. ft. and is all-British throughout.

Cotton Spinning and Doubling

The firm of S. Bourne and Co., Ltd., of Weekday Cross, was founded by Mr. Samuel Bourne in Nottingham in 1869, with a view to manufacturing fine cotton yarns specially for the lace trade, but 20 years later a move was made to the present premises at Netherfield, and since that date there has been an almost continuous series of expansions. The company manufactures fine 2-fold cotton yarns suitable for all purposes, hosiery, weaving, lace and curtains, ribbons, and so forth. The latest expansion has just been completed and the output of the factory is now the largest of its kind in the country. On the death of the founder in 1912 his son, Mr. Stanley Bourne, took his place as governing director. In 1913 Mr. Hugo Likiernik joined the firm, being made a director a few years later. For several years now he has been managing director, and the firm has profited by his able guidance. Though the business at the moment has little or no direct contact with the chemical industry, the members of the Society who visited the works were informed that if they could make suggestions as to the use of chemicals which would impart increased strength to the cotton fibres or yarns, the firm would be only too pleased to consider them.

Ottawa from the Chemical Industry Point of View

Objective of the Imperial Conference

THE interests of the British chemical industry will be represented at the Imperial Conference which opens at Ottawa next week by Dr. E. F. Armstrong (chairman) and Mr. J. Davidson Pratt (general manager and secretary), who have gone to Canada on behalf of the Association of British Chemical Manufacturers. The following notes sum up briefly the chemical industry's attitude towards this Imperial Conference.

THE main objective of the Imperial Conference is the acceptance of a policy of economic co-operation which, by means of a system of preferences, will promote and increase trade between the various parts of the Empire. At the present time there is a large volume of trade between the Empire and foreign countries which might well be kept inside the Empire to the advantage of all its component parts. At the present moment, Great Britain secures only about 40 per cent. of the total importation of chemicals into the other parts of the Empire, leaving a balance of some £23,000,000 (the figure in 1928, the last year for which the full data have been abstracted) which is imported from foreign countries, and of which a large part might be secured for Great Britain by an adequate system of mutual preferences. This compares with the figure of £25,400,000 representing the exports of chemicals, drugs, dyes and colours from Great Britain in 1928. Taking Australia, Canada, New Zealand and South Africa, the position in regard to the imports of chemicals and allied products is as follows:—

	Total Imports.	Imports from U.K.	Per cent. of U.K. Imports.
Australia ...	£6,218,000	2,038,000	32.8
Canada ...	8,886,000	1,045,000	11.8
New Zealand ...	2,475,000	1,048,000	42.3
South Africa ...	3,172,000	1,336,000	42.1
Total ...	£20,751,000	5,467,000	26.3

The chemical industry supports the principle of imperial industrial co-operation, the basis of which is the recognition of the right of every Colony and Dominion to develop its resources to provide employment for its increasing population. Such development has not always been on sound economic lines in the past, and there has been a tendency to start manufactures or secondary industries which, for one reason or another, can never be in a position to produce economically, and to protect them by high tariffs, with serious repercussive effects on the well-being of that particular community as a whole. The suggested form of co-operation, which will probably be discussed at Ottawa, is that British industry should collaborate in the formulation and execution in the Dominions of such schemes as are economically sound, by providing financial or technical resources, and that in return for this, special preferences should be given to British products which cannot be made economically in that particular part of the Empire.

Three Classes of Products

From the point of view of this policy, products might be divided into three main classes: (1) Those which the particular Dominion can make efficiently and economically having regard to all the relevant considerations; (2) those which cannot be produced economically in the particular part of the Empire, but which are efficiently manufactured in Great Britain; and (3) those which are not normally obtainable on an economic basis in the United Kingdom. In this class British preferences would not be required, and apart from the protection of manufacture in the particular Dominion, or revenue considerations, such goods would normally be free of duty. These classes would, of course, differ for each part of the Empire, and would depend on local resources and manufactures.

It cannot of course be expected that steps would be taken by a Dominion Government to eliminate or kill at its birth an industry which might be redundant or uneconomic, but the Government could refrain from bolstering up such an industry fiscally where there were serious doubts as to its future economic development. The industry would then, if uneconomic, eliminate itself, but if economic it would assert itself over its redundant or less economic competitors in other parts of the Empire. An example of bolstering up by fiscal measures of an uneconomic industry is the case of bismuth salts in Australia, which for some time were subject to a duty of 8s. per lb. (British rate) with the object of shutting out completely bismuth salts of non-Australian origin. British makers represented that the manufacture of these salts in Australia was uneconomic, and that the Australian consumer was being forced to take an inferior product at a far higher price than he need pay. The recent reduction of the duty to 3s. per lb. (British rate) appears to indicate that these

contentions have been found to be correct as a full and impartial investigation would have shown before the duty was imposed.

Effective Preference

Preference, to be of any use, must be effective and not only on paper. It is not effective when the preferential duty is still so high that it shuts out the goods of the preferentially treated party just as completely as if there was no preference at all. Nor is it effective when the difference between the preference and the general rates is so small as to be negligible, or when the preference is rendered inoperative through some countervailing provision about the origin of the raw material.

Examples of this are: (*a*) the Australian duty on bismuth salts, which gave the U.K. a preference on paper of 2s. per lb. (British 8s., general 10s.); (*b*) caustic soda, which pays in Canada 3/10 cents per lb. general, and 1/5 cents per lb. British; (*c*) Canada has a provision that where the final cost of an article does not contain 50 per cent. British Labour, and/or materials, it does not qualify for preference. To show how unfairly this provision may apply to Britain, one has only to consider that mercurials made in England with Spanish mercury do not qualify for full British preference, yet mercurials made in Canada with the same Spanish mercury would not be considered as of anything but Canadian manufacture.

This treatment of British mercurials is particularly hard when it is remembered that there is not a sufficient supply of Empire quicksilver available. The Australian Government has recognised that this position may exist in respect of raw materials and made allowance for it by the operation of Appendix D of its explanatory memorandum on preference and values provisions. It is contended that similar provision should be made by the other Dominions.

On the other hand, if the effective British preference is too high, there may be a danger, in the case of Canada, of American firms establishing themselves in the Dominion to the detriment not only of British trade with Canada, but also of manufacturers in this country, in view of the fact that the Canadian manufactured goods would get the benefit of Empire preference.

In view of the preferences which the Dominions have enjoyed in the past (*e.g.*, acetic acid from Canada is imported free of Key Industry Duty into Great Britain, and similarly aspirin from Australia) and are now receiving under the Import Duties Act, there is a strong case for the granting of effective preference to British goods.

Abuses of Preference

Arising directly out of the example quoted under (*c*) are instances in which a product manufactured in Canada could be imported into Great Britain free of duty, yet the same product manufactured in Great Britain not only would pay duty when entering Canada but would pay it at the higher rate. Iodine and quicksilver are admitted into Canada duty free. They can be manufactured there into salts, and reshipped to Great Britain as of British Empire manufacture and enter free, to compete with the home manufacture, which will, incidentally, now have to pay 10 per cent. on its raw material. The firms producing these salts in Canada manufacture in Canada under the protection of a heavy import duty, and can send their surplus unhindered into Great Britain.

There is another danger that will require to be watched, namely the declaration as "British" of American goods imported into Canada and re-exported with drawback to this country where they secure the benefits of Empire goods under the Import Duties Act. There is also the need for a more stringent definition as to the qualification for British preference to prevent American goods which merely undergo finishing processes in Canada being able to claim the benefits of Empire preference.

Some sort of preference might be accorded to goods shipped in British ships. This might take the form of a percentage rebate on the import duty leviable. Shipping from United Kingdom ports is practically exclusively done in British ships, owing to the operation of rings but, if all British administrations granted a rebate on the duty payable on goods arriving in British ships, this would cause importers of goods from foreign countries to specify that shipment should be effected in British ships. This works well in the interest of Portuguese shipping companies trading with the Portuguese Colonies.

A point of particular interest to shippers is the South African practice, in the case of goods which have been imported into Great Britain, paid duty, and re-exported under drawback, of charging an *ad valorem* duty on the English duty-paid price, and ignoring the refund of duty obtained on re-exportation, thereby driving the English shipper to buying such goods abroad and having them shipped direct from a foreign port. This results in loss of profit to the English seller, loss of business to the English shipping company and no gain to the Union of South Africa.

Chemical Trade with India

On the basis of the published data for the year 1930/31 (ended March 31, 1931) the total import trade into India in chemicals and allied products was valued at approximately £8,000,000, of which a little less than £3,300,000, or just over 40 per cent., represented imports from Great Britain. Thus Great Britain now gets a much smaller share of the trade than in pre-war days when the percentage was in the neighbourhood of 70. The present trade in heavy chemicals is threatened by imports from Russia which are likely to increase rather than diminish unless some effective means of stopping them can be found. Speaking generally, the main competitor is Germany, which, since the war, has regained her former commanding position in the Indian dye trade.

At present there are no British preferences in India, and it is important that a special effort should be made to obtain an effective preference for United Kingdom goods which will assist British firms in securing a much larger share of the chemical trade. Apart from the question of preferences, there are other factors of importance. In the first place it is essential that the boycott on British drugs and medicines should be removed entirely. While it may be true that the boycott in that particular form is not so severe as it was, pressure is still being brought to bear on dealers.

Products below Standard

In the second place it is highly desirable that the recommendations of the recent Drugs Inquiry Committee (1930/31) should be put into operation, otherwise any preferences which may be granted to British goods may and can be circumvented and rendered nugatory by the less reputable of our foreign rivals selling, at a lower price, products, the quality of which is below the standard demanded by the Pharmacopœia. This is a practice from which reputable firms have always rigidly abstained, and it is important that less scrupulous dealers should be prevented from indulging in it, especially in view of the serious dangers that may arise from the unsuspecting use of medicinal products of inferior quality.

The Indian chemical industry has been in existence for some time on a small scale, but in recent years more attention has been paid to it. The main activity is in regard to heavy chemicals. The following data from the reports of the Tariff Board of India are of interest:—

Product.	Production. (Tons per annum)	Demand. (Tons per annum)
Sulphuric Acid ...	20/22,000	23,000
Nitric Acid ...	5/600	600
Hydrochloric Acid ...	5/600	600
Phosphoric Acid ...	13·5	300
Epsom Salts ...	2,000/3,000	5,000
Zinc Chloride ...	5·5	1,200
Ferrous Sulphate ...	800/1,000	1,500
Alum ...	800/1,000	4,000
Copper Sulphate ...	100	7,000
Glauber Salts ...	1,000	3,000
Sodium Sulphide ...	12	1,500
Alumino-ferric Sulphate	1,000	4,000

In the case of sulphuric acid, the cost is said to be too high for the commercial production of other products. Other products include magnesium sulphate, magnesium chloride, salt, superphosphate, aluminium sulphate, soda ash, caustic soda, sodium bicarbonate, ammonium sulphate (as a by-product from coal distilation: production in 1928, 15,000 tons), saltpetre, natural indigo (the demand for which is decreasing), tumeric, white lead (dry and in oil), opium, morphine and its salts, quinine sulphate (43,000 lb. made in 1930/31), other quinine salts and methylated spirit.

Canada's Chemical Progress

By S. J. COOK

The author of this article, which is reprinted from a recent issue of our American contemporary, "Chemical Markets," is connected with the National Research Council, at Ottawa.

THE past two or three years have witnessed unprecedented expansion in the Canadian chemical field. This means that, in large measure, the construction of new units in recent years was due primarily to recognition of the fact that when basic fabricating industries are greatly enlarged, the consumption of process materials is also likely to be considerably increased. Careful economic studies indicated that important savings could be effected through the building and operation of these subsidiary plants and that the whole financial structure of the participating companies was likely to be improved through this diversion of output and the resulting growth of trade.

In Western Canada the progress of the Consolidated Mining and Smelting Co. at Trail, B.C., traceable in large measure to the activities of the excellent research department under the stimulating leadership of the company's general manager, has been almost phenomenal. While the Trail smelter was built in 1895 to treat the gold-copper ores of Rossland Camp, it was not until the company's research department developed a satisfactory method for the treatment of the complex ores of the famous Sullivan mine that the works attained anything of their present-day importance. With establishment in 1916 of the electrolytic zinc plant, the company entered on a wonderful period of development, and Trail is now one of the world's largest non-ferrous metallurgical plants.

Recovery of Sulphur Fumes from Smelters

Sulphur fumes from the Trail smelter increased in volume, and blown by prevailing winds crossed the border into Stevens County, Washington, and caused damage, so that protests were raised and official intervention followed. After a prolonged investigation of the problem, the International Joint Commission recommended that the company should be required to compensate the property owners to the extent of $350,000 and to reduce the volume of sulphur fumes from their smelter to such a point that no further damage will be done. To solve this problem, the company undertook to recover the sulphur in the fumes as sulphuric acid, and as the market for acid in that part of Canada was small, it was decided to engage in the manufacture of superphosphate fertiliser. Trial shipments of superphosphate were sent to the prairies, but it was soon found that for growing grain the soils of the prairies need nitrogen and potash as well as phosphoric acid, and that therefore the superphosphate fertiliser alone would not be likely to find a ready or continuous sale. Appreciating that half measures were not likely to succeed, the company decided to erect plants for the manufacture of synthetic ammonia. The first section of the first unit, consisting of the manufacture of what is known to the trade as "triple superphosphate" and "mono-ammonium phosphate," was put into operation at Warfield towards the end of 1930. Construction has been continued on the plants for the manufacture of hydrogen, nitrogen and ammonia.

Another development at Trail of more than ordinary interest was the construction last year of a lead-furnace-slag re-treatment plant that is now producing upwards of 100 tons of pure zinc daily from old slags that were discarded from the lead furnace department in earlier years. In the development of this process the company's research department worked in co-operation with metallurgists of the Anaconda Copper Mining Co., which has erected a somewhat similar plant. The process is comparatively simple. Briefly, it consists of blowing coal dust into the molten slag, reducing the zinc to metal, volatilising, re-oxidising, cooling and collecting the zinc in bag houses. The fume is dissolved in sulphuric acid and the zinc is recovered by the electrolytic process.

An Increased Demand for Chemicals

Another interesting development in the chemical industry of Canada has been the consolidation of companies now known as Canadian Industries, Ltd. Originally known as Canadian Explosives, Ltd. (itself a merger of a number of small independent powder companies), the parent organisation has extended along logical lines to one of the most important factors in Canada's chemical trade. When black powder gave way to nitro-glycerine products, sulphuric and nitric acids for nitration became necessities in the explosives industry. Similarly, nitrocellulose, a necessity in the production of gelatinised explosives, created a demand for large quantities of ammonia. Nitrocellulose lacquers, provided a connection with the paint and varnish industry, and the manufacture of nitrocellulose plastics offered another outlet in an allied field. For the manufacture of ammonia, hydrogen was required, and this was found as a by-product in the electrolytic decomposition of brine at the Salt Works in Sandwich, Ontario, but the company's nitric acid plant, in which the ammonia is used, has been located at Beloeil, Quebec, where the manufacture of explosives, and the production of fertilisers and of ammonia chemicals are carried on.

Another avenue along which Canadian Industries have travelled is the manufacture of sodium acid sulphate at Copper Cliff where the great nickel copper smelting plants of the International Nickel Co. are located. Until recently, it was difficult to secure a sale for nitre cake, and the nickel smelting plants in Canada were able to obtain large quantities at a low price, as it was a by-product, in the manufacture of nitric acid from sodium nitrate. Ammonia oxidation has changed this situation. Consequently, the new works of Canadian Industries, Ltd., at Copper Cliff near Sudbury, Ontario, were erected to produce sodium acid sulphate as a direct product for use in nickel smelting.

At Sandwich, Ontario, in the plant of the Canadian Salt Company, now owned by Canadian Industries, Ltd., caustic soda and chlorine are made by the electrolytic process during which hydrogen is evolved. Formerly, this gas went to waste, now it is collected and pumped to the new ammonia department. The Casale process is used and the product, liquid anhydrous ammonia, is shipped chiefly to the company's works at Beloeil, Quebec, where it is used to make synthetic nitric acid for use in the production of explosives.

Synthetic Nitric Acid Plant

McMasterville is the town name of the plants situated some twenty-five miles from Montreal on the banks of the Richelieu River. In the heart of this district new chemical enterprises are springing up. Those completed are the first ammonia oxidation unit in Canada and a superphosphate plant that is said to be so new in design and operation that it may be listed as the second works of its kind in North America. The raw material is synthetic ammonia, pure and anhydrous. The estimated possible plant capacity is twenty tons of 100 per cent. nitric acid per twenty-four hours. The product is pure and suitable for nitrate manufacture, but requires concentration for glycerine nitration. There are no solid floors in this plant to obstruct daylight and the whole works is easily visible from most inside points. The plant cost, in round figures, $300,000, but it is important because it is the first Canadian synthetic nitric acid plant in operation. The works taken as a whole represent the accumulated experience of the best chemical engineers at the command of the largest chemical organisations in England, United States and Canada.

With the amalgamation of the International Nickel Co. and the Mond Nickel Co., whose operations in the Sudbury area have made this section famous for many years as the world's chief source of nickel, a great impetus was given to the construction of subsidiary manufacturing plants to serve the mining enterprise. The Mond company built in 1925 a sulphuric acid plant to utilise the sulphur-bearing gases from the Bessemer converters, and this plant was enlarged to more than double its previous capacity. Then, with the possibility of an insufficient supply of nitre cake, a new plant was constructed for the manufacture of sodium acid sulphate, an essential material in the refining of nickel by the Orford process.

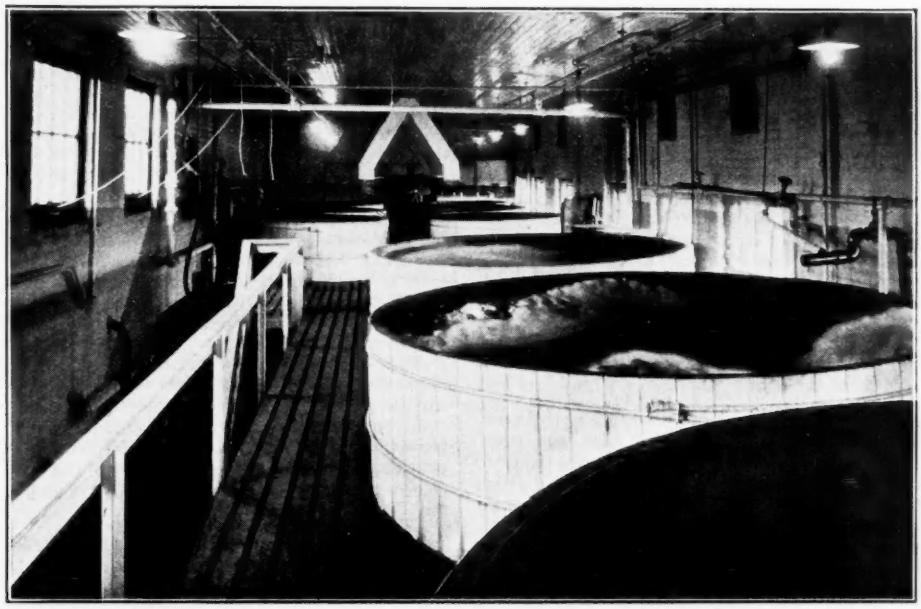
Here the elements of the operation are not complex. Sodium sulphate is recovered from natural lake deposits in Saskatchewan, hauled to Sudbury by rail and treated with sulphuric acid. The sodium sulphate after screening is passed through a screw conveyor to a mixing chamber of the conveyor type where the sulphate and 93 per cent. sulphuric acid are mixed to a thick paste continuously. From the mixing trough the acid and sulphate drop into an oil-fired retort where the nitre cake is formed. These retorts are similar to those used in nitric acid manufacture but have been redesigned for this purpose. The molten sodium acid sulphate overflows continuously through an opening in the side of the retort and is caught in a series of pans attached to a moving chain passing away from the retort at a rate of 120 feet per hour, so that the nitre cake has a chance to set and cool in the pans of the conveyor. The pans are sprayed with oil so that the cakes will drop out readily when cooled.

Another new development in Ontario is a plant in Toronto for the production of phenol, the cresols and cresylic acid. One of the principal outlets for the phenol will be in the manufacture of phenol-condensation products that have been made in Canada for some years from imported raw materials. There has also been a large output of chemicals from Quebec for many years. Shawinigan Falls was the centre of one of the largest wartime chemical developments. To produce an adequate supply of electric energy, the St. Maurice River was harnessed and by building suitable dams, a reserve of water supply created that insured a steady flow. One of the uses made of this electrical supply was to convert lime-stone into calcium carbide in electric furnaces and then, using calcium carbide as the starting material, the Shawinigan company built up a long series of synthetic chemicals of which the most important were acetic acid and acetone. Acetaldehyde, paraldehyde, crotonaldehyde, acetaldol and acetylene carbon black were added in due course, and more recently ethyl acetate, butyl acetate, butanol, ethyl lactate and pentasol acetate.

Electro-Metallurgical Works

Further east in Quebec is the town of Arvida on the upper Saguenay near Lake St. John, where enormous hydro-electric plants have been constructed primarily to supply power for the manufacture of aluminium. At Isle Maligne the present installation develops 495,000 h.p. and the ultimate capacity is 540,000 h.p.; at Chute à Caron another plant supplies 260,000 h.p.; and when the power from these two units is no longer sufficient to meet the needs of the industrial development that is proposed in this area, a new canal will be built to carry the water about two miles farther down the Saguenay to the mouth of the Shipshaw river where the remaining head will be utilised to develop another 8,000 h.p.

There are three units in the present electrometallurgical works at Arvida. The first is for the treatment of raw bauxite, which is put through an electric furnace process to remove impurities and furnish almost pure alumina for the production of aluminium. Bauxite is obtained from British Guinea and also from deposits in Arkansas and Missouri. The second plant produces carbon electrodes for use in the aluminium process, and the third and last is the one in which the aluminium is made and turned out in the form of pigs for shipment to markets all over the world. The aluminium plant is purely electrolytic; the alumina or aluminium oxide is dissolved in a bath of molten cryolite and then the metallic aluminium is plated out by the electric current, deposition taking place on the bottom of the furnace.



Fermentation of Grain and Molasses at one of the works of the Canadian Industrial Alcohol Co., Corbyville, Ontario: A view of the Yeast Room.

Analytical Standards

Pioneer Work of The British Drug Houses, Ltd.

THE second edition of "The B.D.H. Book of A.R. Standards" contains revised monographs for the 158 chemicals contained in the first edition, and also new monographs for 50 other substances. In addition, the limiting values of the various tests have been stated at the head of each monograph in the form of a table which represents the maximum permissible limit of various impurities. This book defines, as exactly as possible, the commercially attainable standards for many of the chemicals used for scientific purposes for which purity is of the first importance. Its object is to give a precise meaning to the term "A.R." and to provide a clear definition of the purity of chemicals described as "A.R." and sold under the B.D.H. label. Six years have elapsed since the issue of the first edition. During this period important advances in analytical practice have been made, and new and delicate tests have been devised. Many of the B.D.H. specifications have been made more stringent, others have been more accurately defined.

Copies of the second edition may be obtained direct from The British Drug Houses, Ltd., Graham Street, City Road, London, N.1, at 2s. 9d. each, post free.

Tung Oil from Empire Resources

A Possible Industry for New Zealand

CHINESE wood oil was introduced commercially into western Europe over thirty years ago and to-day is an essential raw material of paint and varnish manufacture. It possesses unique drying properties which render it indispensable for certain types of varnish in which tough, water-resistant films of high gloss are desired. The oil is also widely used in the manufacture of electrical insulating varnishes. At the present time the only source of commercial supplies of the oil is China, from which over 69,000 tons were exported in 1930. The principal market for the oil is in the United States, where increasing quantities are being used every year, some 56,000 tons having been imported in 1930. In comparison, only small quantities are imported into the United Kingdom, the figure for 1930 being about 4,000 tons. The use of Chinese wood oil in the latter country is becoming more general, while other European countries also are beginning to display an interest in the oil and increasing amounts ultimately find a market in these countries.

In view of the importance of Chinese wood oil to the paint and varnish manufacturers, the need has been felt of freeing this industry from its sole dependence on China for supplies. Accordingly attempts have been made to grow the trees in other countries of the world. In the United States the cultivation of *Aleurites Fordii* on a commercial scale has been started within the last ten years in certain southern States, and the acreage under the crop is being continually increased. For example, in Florida the area was 2,500 acres in 1926, 4,000 in 1928, and 5,000 by the end of 1929. In Georgia 2,000 acres had been planted up to 1930 and it was proposed to add another 3,000 acres in the autumn of 1931. In the first half of that year (1931), 4,000 acres were planted in Mississippi and 2,000 in northern Florida. A few of these plantations are now in bearing.

Empire Cultivation

The question of the cultivation of tung trees in the British Empire was taken up in 1927 by the Imperial Institute Advisory Committee on Oils and Oilseeds and this Committee, in collaboration with the director of the Botanic Gardens, Kew, and the director of the Research Association of British Paint, Colour and Varnish Manufacturers. distributed supplies of seed obtained from China and Florida to various countries of the Empire.

In view of the importance of producing tung oil in the Empire, the question was considered by an inter-departmental conference convened by the Department of Scientific and Industrial Research in March, 1929, and on their recommendation a special sub-committee was appointed by the Advisory Committee on Oils and Oilseeds to deal with this problem. Besides continuing the encouragement of the experimental cultivation of tung trees within the Empire by the distribution of seed and the dissemination of related information, the Sub-Committee have arranged for the investigation at the Research Station of cognate problems, the elucidation of which will contribute to the success of this Imperial production. Among the investigations that have been commenced are a comparison of the chemical and physical properties of the oils of *A. Fordii* and *A. montana* and the determination of the value as a feeding-stuff for animals of the cake or meal left after the removal of the oil from the seeds. In addition, a memorandum entitled " The Production of Tung Oil in the Empire " was prepared at the Imperial Institute with the co-operation of the sub-committee and issued by the Empire Marketing Board, who, besides undertaking the publication of this pamphlet, have provided the necessary funds for the investigation.

Company Developments in New Zealand

Seeds of *A. Fordii* have been sown annually for the past three or four years at the Government Horticultural Station at Te Kauwhata, New Zealand. The germination has been good and satisfactory plants have been raised without any special difficulty. As yearlings these plants have been set out in plantations or on farms in Auckland, Hawkes Bay and Nelson Provinces. These have made normal growth and the trees have carried a small crop. Should these parts of the Dominion prove satisfactory as regards soil and climate for theg rowth and fruiting of the trees a valuable industry might be established. The number of trees, however, that have been grown to maturity in the Auckland district is too small to enable a confident opinion to be formed of the future prospects of this industrp, But the experimental trials already made in numerous localities by the Department of Agriculture andt he State Forest Service should serve to indicate what parts, if any, are suitable for the establishment of large scale plantations.

Five public companies with a total nominal capital of £780,000 have been formed to develop the cultivation of tung trees on a commercial scale in the North Auckland district. One of the five companies, the New Zealand Tung Oil Corporation, has acquired land at Kaukapakapa, North Island, for the purpose of establishing plantations. Five hundred acres have already been planted. Another company, Paerenga (N.Z.) Tung Oil, Ltd., has an estate in the extreme north-west corner of North Island. No trees had been planted out by last October, but there were sufficient seedlings in the nursery for 500 acres. The Northern Tung Oil, Ltd., owns plantations in Mangonui district about 300 miles north of Auckland, and has apout 500 acres under preparation. Other companies interested are Empire Wood Oil (N.Z.), Ltd., and Natural Products (N.Z.), Ltd.

In addition to the trials carried out in the United States and the British Empire, attempts are being made to cultivate Chinese wood oil trees in Argentina, Paraguay, Brazil, Sumatra, Java, Portuguese East Africa, Madagascar, Cuba, Hawaii and the Phillipine Islands. Of these trials the most important are those being made in South America. In the Agentine the greatest activity centres round San José and Pindapap in Misiones, where it is estimated there were some 50,000 trees last October. All the trees have made rapid growth and many have fruited. In Paraguay there are about 30,000 trees, the largest single planting being that made by the Paraguay Central Railway.

Effect on Future Market Prices

The influence of the increased production on the price of tung oil is a point which will occur to those who are contemplating engaging in this new industry. On this question it must be stated that during the last two years the price of the oil has fallen considerably, as is shown by a comparison of the price in January, 1930, of £69 10s. per ton in London for Hankow Chinese wood oil with that in September, 1931, of £37 10s. This heavy fall in price was due largely to the lower value of silver and has been accentuated by the general decline in the prices of all commodities. During the last few months the price of tung oil has risen again owing to the depreciation in the value of sterling and was in February, 1932, quoted at £51. It is considered, however, that tung oil will always command a price of at least £10 per ton above that of linseed oil, on account of its special properties, which make its use essential in the manufacture of certain types of varnishes. It must also be remembered that new uses may be found for tung oil, which will result in a demand for increased quantities. A potential new use is in the linoleum industry, as it is possible that tung oil, on account of its property of gelation, may prove more suitable for this purpose than the linseed oil now used and that the process of manufacture may be quickened and cheapened when tung oil is employed. Should this prove the case, large quantities of this oil will be required, as the linoleum industry in the United Kingdom alone uses some 50,000 tons of linseed oil annually.

Tung oil produced on Empire plantations should be of better quality and colour than the present supplies from China, because it will be prepared by modern machinery under skilled supervision. In addition, Chinese oil is often adulterated, while in the case of the plantation product the likelihood of such sophistication is remote. Therefore, unless the quality of the Chinese oil improves, the plantation oil should command a higher price and there should be a larger demand for this grade.

The Chemical Industry and Trade of Canada

A Statistical Review

CANADA'S chemical industry is diversified as well as extensive, and produces the greater part of the chemicals that are consumed in that country. In 1931 the apparent consumption of chemicals and allied products amounted in value to $121 millions, of which $101 millions, or 83 per cent., was of domestic manufacture. An average of 14,300 persons were employed in the 592 plants which made chemicals and allied products, but by extending the scope of the chemical industry to include the other factories which primarily use chemical processes, approximately 100,000 workers were employed, which means that about half a million people, or five per cent. of the total population of the country, are dependent for their support on chemical manufactures or chemical process industries.

For the manufacture of industrial acids there are a number of extensive plants which apparently are of sufficient capacity to care for domestic requirements. Sulphuric acid is made at seven plants, acetic at three, hydrochloric at three, nitric at two, hydrofluosilicic at one and phosphoric at one. In the alkalies and salts group are some of the most important works which produce calcium cyanamide, sodium cyanide, soda ash, caustic soda, nitre-cake, salt-cake, Glauber's salt, calcium carbide and ammonium sulphate. Compressed gases such as acetylene, carbon dioxide, and oxygen are made in a number of plants which are strategically located across the country. Synthetic ammonia is now made in two new plants, and liquid chlorine is produced by one concern. Coal tar is distilled at ten different units and coal tar derivatives such as phenol and cresol are being made at one plant which has recently been put into operation. Explosives are manufactured in quantities sufficient to meet the needs of the mining industry and for other requirements. Mixed fertilisers are being produced in increasing quantities and superphosphate is made at four different establishments. Paints are produced in numerous factories, as also are soaps, medicines and toilet preparations.

Possibilities of Expansion

Expansion in the industry might be brought about by producing in Canada commodities that are now being imported; by a more extensive exploitation of the export market; and by research leading to the production of new chemical products, thus opening up new fields for industry and to the development of new uses for the chemicals at present being produced. Only a few years ago such common articles as rayon, nitro-cellulose lacquers, bakelite and cellophane were in the research stage, but to-day they are accepted almost as necessities, and have contributed substantially to the industrial progress. There are, no doubt, many similar commodities in the making that will vitally affect the chemical producers. In the export field the possibilities of expansion are not very bright but yet are worthy of investigation. In these days of mass production it is a tremendous task for manufacturers in a country like Canada, where the size of the plants is primarily governed by the small domestic market, to compete with the heavily industrialised countries like the United States, Great Britain or Germany. The hope in this direction would seem to be chiefly in the electro-chemical field, although there may be other opportunities as well. Already there is a large export trade in such chemicals as cyanamide, acetic acid, sodium compounds, ammonium sulphate, and similar ventures are within the realm of possibility.

In the replacing of imports there may be a greater opportunity. In 1931 imports totalled $31,337,000. In this category are such items as superphosphate, $936,000; ammonium sulphate, $369,000; caustic soda in packages, $342,000; sodium cyanide, $287,000; litharge, $232,000; liquid chlorine, $172,000; printing ink, $288,000; shoe blacking, $313,000; other polishes, $416,000; red lead, $98,000, and others of a like nature, all of which are already being made in the Dominion. There are also many commodities that are not made in Canada at the present time but which seem to offer possibilities to the enterprising manufacturer. True, it may be, that it is not economical to make some of these chemicals in Canada at the present time, but conditions do not always remain the same, and what is not now practical may be successfully exploited a year or two hence. These imports in 1931 included aniline and coal tar dyes, $1,891,000; zinc oxide, $641,000; aluminium sulphate, $536,000; lithopone, $560,000; calcium chloride for road treating, $476,000; sodium silicate, $401,000; sodium bicarbonate, $188,000; lead arsenate, $117,000; copper sulphate, $192,000; bichloride of tin, $177,000; carbon bisulphide, $83,000; regenerated cellulose in sheets and cellulose acetate, $328,000.

Chemical Industry in 1931

In common with industry the world over, the chemical industry in Canada has suffered severely from the prevailing depression. Preliminary figures for 1931 indicate a decline of 16 per cent. from the 1930 value, which in turn was 13 per cent. below the peak year of 1929. The 1931 output value was $101,137,000, as compared with $119,970,000 in 1930. Of the fourteen industries in this group, ten showed declines in output while four actually reported higher production than in the previous year. Toilet preparations, polishes and dressings, and flavouring extracts showed small increases, while the fertilisers industry gained 65 per cent. The most drastic decline was in the heavy chemical industry, which dropped to about one-half the value of the previous year, while recessions in the other groups ranged from 23 per cent. in coal tar distillation, 23 per cent. in compressed gases, and 20 per cent. in paints to only 10 per cent. in the inks industry. Capital employed in 1931 totalled $161,063,000, which was only 4 per cent. below the corresponding figure for 1930. While most of the industries showed a lower capital investment than in the previous year, these losses were partially offset by a gain of over $11,000,000 in the fertilisers industry. Employees numbered 14,300, a drop of about 8 per cent. Payments in salaries and wages for the year aggregated $20,224,000.

The chemical industry is centred chiefly in Ontario and Quebec. In 1931 there were 313 establishments in Ontaria and the output value was $58,843,000, while in Quebec there were 173 works with a total production worth $31,257,000. British Columbia was third with 38 plants in operation and output valued at $4,280,000. Manitoba, Nova Scotia, New Brunswick, Alberta, Saskatchewan and Prince Edward Island followed in the order named.

A decline of almost $10,000,000 in the acid and alkali industry, which produces the bulk of the heavy chemicals for commercial use. In 1931 production was $10,767,000 or slightly more than half of the 1930 figure, which in turn was 8,000,000 below the value for 1929. Cyanamide, soda ash, sodium cyanide, caustic soda, sodium hypochlorite, phosphorus and phosphoric acid, acetic acid, sulphuric acid and similar chemicals were made. Sulphuric acid production in 1931 totalled about 110,000 tons, as compared with 107,000 tons in 1930. There were seven sulphuric acid plants in operation, the works at Coniston, Ontario, having been closed down; two of these plants utilised the sulphur in waste smelter gases, the others used 15,200 tons of sulphur and 8,900 tons of pyrites.

There were three important developments in this industry during 1930, all by Canadian Industries, Ltd. At Copper Cliff, Ontario, in June, this company opened a new plant to produce sulphuric acid by utilising the waste gases from the new smelter at that point. In July, another plant at the same point commenced to produce sodium acid sulphate, or nitre-cake, as its main product. This commodity is used in large quantities in the refining of the nickel-copper matte which is now produced at the new Copper Cliff smelter. Formerly all requirements were imported from the United States, where abundant supplies were available as a by-product of the nitric acid works, but the rapid development of synthetic acid manufacture in that country has changed the situation entirely and by-product nitre-cake (which formerly could hardly be disposed of) is now in great demand.. This fact, together with the concentration of the operations of the International Nickel Co., at Copper Cliff, and a desire to utilise Canadian natural resources led to the building of this new plant in which about 50 per cent. of the output of the new

acid works is used to treat natural sodium sulphate brought from the lakes in Saskatchewan. Imports of nitre-cakes into Canada declined from 80,870 tons in 1929 to 15,270 tons in 1930. The third development was at Sandwich, Ontario, where in June, 1930, a plant was opened to produce synthetic ammonia. In the caustic soda works at that point liquid chlorine and sodium hydroxide are obtained from the electrolysis of salt brine and larger quantities of hydrogen are liberated in the process. Formerly this gas went to waste, but it is now collected and pumped to the new ammonia plant where it is used to burn the oxygen out of air, leaving nitrogen which is united at high pressure with more hydrogen to make ammonia. The Casale process is used and the product is pure liquid ammonia.

Coal Tar Products

Ten tar distillation plants were in operation, as in 1930. Production was valued at $2,576,000 or 23 per cent. lower than in the previous year. Creosote oils, refined tar and pitch are the main products of these plants. The outstanding development in this industry was the completion of the new plant of the Dominion Tar and Chemical Co., at Toronto, for the production of phenol, cresylic acid, cresol, ortho-cresol, meta-para-cresol and other tar derivatives. This is the first unit of its kind in Canada, and in January of this year, it commenced to produce these chemicals which formerly had to be imported.

Production of industrial gases declined 23 per cent. to $2,752,000 in 1930. Acetylene, oxygen, carbon dioxide, hydrogen and ammonia were the main products. Liquid chlorine is made at Sandwich, Ontario, and synthetic ammonia is made at Sandwich and at Trail, B.C., but the output from these plants is included under the heavy chemical and the fertilisers industries.

Fertilisers

The new fertiliser works of the Consolidated Mining and Smelting Co., at Trail, B.C., commenced operations during 1931 and this fact accounted for a 65 per cent. gain in the output value for this industry. There was also increased activity in the other fertiliser works and two or three new branch plants were established in the Maritimes, but statistics are not yet available for these new units. Production from this industry in 1931 reached a value of $4,147,000 (as compared with $2,504,000 for 1930), and employees increased to 600. Superphosphate is now made at four plants; sulphate of ammonia is made at the new Trail works and at seven coke and gas plants; ammonium phosphate is made at two plants. The special survey of the fertiliser trade in Canada for the year ended June 30, 1930, showed that 155,000 tons of mixed fertilisers and 166,000 tons of fertiliser materials were marketed in Canada, chiefly in Ontario and the Maritimes.

Paints, pigments and varnishes is the largest industry in the chemical-using group. Output in 1931 aggregated $19,182,000 in value, a decline of 20 per cent. from 1930. The fifty-nine plants in Ontario and Quebec accounted for 88 per cent. of the production. Soaps and washing compounds totalled $16,822,000 (a decline of $1,345,000); toilet preparations amounted to $5,172,000 (an advance of nearly a million dollars). Only five wood distillation works were in operation during 1931; charcoal, acetic acid, wood alcohol and formaldehyde being the main products. Eleven factories operated in the adhesives industry, where the main products were bone and hide glue, vegetable glue, paste, size and sealing wax. Twenty-four establishments produced flavouring extracts, jelly powders and similar articles worth $1,609,000 (a slight gain compared with 1930). Polishes of all kinds were the main products of thirty-four different manufacturing plants.

Imports and Exports

Imports declined 15 per cent. in the calendar year 1931, when purchases from foreign countries amounted in value to $31,337,000. Imports values for previous years have been as follows:—

1927	$33,313,000
1928	36,963,000
1929	40,131,000
1930	36,785,000
1931	31,337,000

Purchases were made in 34 different countries, but about 67 per cent. came from the United States, 13 per cent. from the United Kingdom, and 8 per cent. from Germany. France, Belgium, Netherlands, and Chile were also important sources of supply. Exports for the past few years have been as follows:—

1927	$17,266,000
1928	18,356,000
1929	21,827,000
1930	16,320,000
1931	10,849,000

The main items of export were cyanamide, soda and soda compounds, acids (other than sulphuric acid), cobalt oxides and salts, ammonium sulphate, manufactured fertilisers, acetates of lime, arsenic, paints and soaps. Cyanamide shipments declined sharply, while most of the other items showed smaller decreases. Shipments were made to 73 countries, the United States (42 per cent.), United Kingdom (27 per cent.), Mexico (10 per cent.), Portuguese Africa, Newfoundland and Cuba being the principal destinations.

Chemical and Metallurgical Corporation

Reduction of Capital Sanctioned

IN the Chancery Division on Monday, Mr. Justice Eve had before him a petition by the Chemical and Metallurgical Corporation, Ltd., for the sanction of the Court to the reduction of its capital from £1,200,000 to £548,298.

Mr. COHEN, K.C., stated that the reduction involved some re-organisation of the company. It was proposed to reduce the £1 preference shares to 10s. and the 2s. ordinary shares to 4d. There would then be a consolidation back and the capital would be increased to £1,200,000 by the creation of new shares. The total loss of the company was £651,000.

His lordship sanctioned the reduction.

Chemical Matters in Parliament

Drug Manufacture

IN the House of Commons on July 7 Mr. Morgan Jones (for Mr. Rhys Davies) asked the Home Secretary what is the number of factories in this country engaged in the manufacture of opium, heroin, cocaine and other noxious drugs, the amount of capital involved and the number of employees; and whether any of the supplies of these noxious drugs that are sold in London are of British manufacture?

In reply Mr. Stanley said that seven firms are licensed to manufacture medicinal opium, two to manufacture morphine and heroin, and one to manufacture cocaine. The manufacture is carried on in connection with the manufacture of other things, and it is not possible to say what proportion of the staff or capital is to be regarded as engaged on the manufacture of these drugs.

Acid-Resisting Tile Linings

Application to Wood Vessels

THE firm of John L. Lord, of Bury, have had more than 30 year's experience in all kinds of linings for acid-resisting purposes. They introduced tile linings for wood vessels, and such linings are daily at work which were installed between 20 and 30 years ago. These linings are shaped to the contour of the vessels, and are composed of tongued and grooved acid-resisting tiles 1½ or 2 inches thick, firmly bedded in acid-resisting cement. They withstand the action of boiling acid even under steam pressure. Heat and acid-resisting paints of first class quality are also supplied; these paints can be applied for the protection of the exterior of acid plant.

Iodine Producers Cartel in France

FRENCH iodine producers are planning to open negotiations with the German producers with a view to concluding an accord relating to German iodine imports into France. A high tariff rate on iodine and iodine derivatives has been requested by French producers in case the international convention should be dissolved.

Patent Dispute

The Storage of Liquefied Gases

In the Chancery Division on Thursday, July 7, Mr. Justice Luxmore commenced the hearing of an action by A. G. fur Industriegasverwertung, a German company, against British Oxygen Co., Ltd., and of a second action by the British Oxygen Co., Ltd., against the German company.

Sir Stafford Cripps, K.C., appeared for the German company and said his clients had discontinued their action against the British Oxygen Co. for infringement of patent, and the British Oxygen Co. had dropped a counterclaim for the revocation of the patent, but there still remained to be tried a claim by the British Oxygen Co. for the revocation of two of plaintiffs letters patent, *viz.*, No. 149,233 for improved method and means of storage, transporting and delivering for use, gas under pressure from liquefied gases, and No. 279,041 for an apparatus for preparing compressed gases. Counsel said the British Oxygen Co. manufactured liquid oxygen which was used in large quantities for welding and cutting metal, and the only issue now remaining for trial was the petition by the British Oxygen Co. for the revocation of the two patents of the plaintiffs he had named on grounds of lack of novelty, of subject matter and of utility, and on the ground of ambiguity and insufficiency of the patents.

Sir Stafford remarked that as his patents were attacked by the British Oxygen Co. he had the right to open his case for his German clients. Until the invention of Patent No. 149,233, which made possible a vessel in which commercial quantities of oxygen could be transported, the problem of transport, of the weight of the containers, and the methods proposed to obviate various difficulties as they arose, made up the eventful history of the discovery. By the invention liquid oxygen could be taken long distances in a container which was very light compared with the heavy cylinders used before, and there was no appreciable loss of liquid air during the transport. From the liquid was generated the gas required for commercial purposes. It was really Patent No. 149,233 which enabled the industry to be built up. The British Oxygen Co. pleaded that No. 149,233 was not new, and cited about 20 prior patents here and in America.

Counsel submitted that some of the prior documents were futile in respect of the problems to be dealt with. There was, for instance, a motor car which was to be run by liquid air, where one sat over the condenser, but these ideas had no possible sort of relation to the problem solved by his client's container, by means of which liquid oxygen could be transported over hundreds of miles by rail, road and sea. Dewar first solved the difficulty of the container. The court would recall the heavy containers used 10 years or so ago. In 1920 plaintiffs got their first patent, which combined lightness of vessel with safety, eliminated the old rate of loss by evaporation and enabled all the oxygen to be employed to the end of the supply in the container.

Patent No. 279,041 claimed that, for coping with sea-sickness, a constant supply of oxygen in ships was necessary. What the patent, which was concerned with storage, stated was that if one wanted to have oxygen on board ship for this purpose, for a voyage, it was necessary to have some such method of storing large quantities. The liquid would be taken to the ship in containers with thin walls and for use in the ship transferred to high pressure vessels that have thick walls.

In 1929 the British Oxygen Co. issued a book on the transport of oxygen. That was nine years after the plaintiffs' patent and Sir Stafford said he invoked the book as an admission of the utility of the plaintiffs' patent. The British company had admitted the advantage of transport in liquid state and the economy of employing liquid oxygen for conversion to industrial uses as a gas. The British company had acquired the rights for the British Empire of a system of the French company the Société l'air Liquide, who counsel said purchased their patents from his clients. In 1928 the British company investigated his clients' system and took option on the Empire patents which they did not take up.

Dr. J. S. Brown, of Glasgow University, M.I.M.E., giving evidence, said his firm delivered liquid oxygen throughout commercial Britain both by rail and road, and he appreciated the value of the plaintiffs methods. The transport was economical—cheaper than gas cylinders—and liquid oxygen cost little more to make than gaseous oxygen.

Chemical Industry Lawn Tennis Tournament

Second Round Results: Third Round Draw

The third round of the second annual Chemical Industry Lawn Tennis Tournament for The Chemical Age silver cup was completed on Monday, and the draw for the fourth round was made on Tuesday. Appended are the results of the matches in the third round, together with details of the draw for the fourth round, showing the last eight pairs left in the competition. The final will be played at Blunt House, Oxted, by kind invitation of Sir Ernest and Lady Benn, on Saturday, September 10. All matches in the fourth round must be played off by August 1, and the results, signed by all four players (winners and losers) must be sent to the Editor of The Chemical Age, Bouverie House, Fleet Street, E.C.4, immediately after each match, and must reach the office of The Chemical Age not later than 9.30 a.m. on August 3.

Third Round Results

S. E. Chaloner and W. Speakman (Monsanto Chemical Works, Ltd., Ruabon) beat C. H. B. Jones and Eric Cox (Anglo-Persian Oil Co., Ltd.), 6—3, 6—4.

A. Collins and H. Sibley (British Oxygen Co., Ltd.) beat L. F. Grape and R. C. Mugridge (Borax Consolidated, Ltd.), 6—0, 7—5.

Idris Williams and T. Clarke (Monsanto Chemical Works, Ltd., Ruabon) beat W. B. Miller and G. Lord (British Celanese, Ltd.), 6—3, 5—7, 6—3.

C. G. Copp and W. W. Marchant (Doulton and Co., Ltd.) beat M. B. King and R. H. Hornsby (Howards and Sons, Ltd.), 6—4, 6—8, 7—5.

J. W. Urban and F. S. Mortimer (Monsanto Chemical Works, Ltd., London) beat J. E. Shireff and G. G. Stamford (Johnson, Matthey and Co., Ltd.), 6—3, 6—2.

A. G. R. Clarke and F. E. Peake (G. A. Harvey and Co., Ltd.) beat F. C. White and A. W. White (Howards and Sons, Ltd.), 6—3, 6—3.

E. Thomsett and R. Welsh (British Oxygen Co., Ltd.) beat L. Seabrook and R. Frost (British Oxygen Co., Ltd.), 6—3, 6—2.

G. F. Hammond and L. Giltrow (Williams, Hounslow, Ltd.) beat W. S. Alldis and S. Perridge (Chemicals and Coke Ovens, Ltd.), 6—4, 6—1.

Fourth Round Draw

Following are the details of the fourth round draw. All matches must be played by **August 1**, and the results must reach the Editor of The Chemical Age by 9.30 a.m. on August 3 at the latest.

S. E. Chaloner and **W. Speakman**
Monsanto Chemical Works, Ltd., Ruabon, N. Wales. (Phone: Ruabon 3.)

v

Idris Williams and **T. Clarke**
Monsanto Chemical Works, Ltd., Ruabon, N. Wales. (Phone: Ruabon 3.)

J. W. Urban and **F. S. Mortimer**
Monsanto Chemical Works, Ltd., Victoria Station House, Victoria Street, S.W.1. (Phone: Victoria 1535.)

v

A. Collins and **H. Sibley**
British Oxygen Co., Ltd., Angel Road, Upper Edmonton, N.18. (Phone: Tottenham 2488.)

E. Thomsett and **R. Welsh**
British Oxygen Co., Ltd., Angel Road, Upper Edmonton, N.18. (Phone: Tottenham 2488.)

v

G. F. Hammond and **L. Giltrow**
Williams (Hounslow), Ltd. (Phone: Hounslow 2929.)

C. G. Copp and **W. W. Marchant**
Doulton & Co., Ltd., High Street, Lambeth, S.E.1. (Phone: Reliance 1241.)

v

A. G. R. Clarke and **F. E. Peake**
G. A. Harvey & Co. (London), Ltd., Woolwich Road, S.E.7. (Phone: Greenwich 0020, extension 311.)

Chemical Notes from the British Empire

Fuel Alcohol in Jamaica

THE Sugar Manufacturers' Board of Jamaica has taken up a proposal relating to the manufacture of fuel alcohol in the colony, and experiments have been carried out on a sugar estate. It is proposed to erect a central distillery near Kingston for the manufacture of fuel alcohol on a fairly large scale, the alcohol to be mixed with petrol for motor vehicles, as is done in Cuba and some other countries. It is claimed that the addition of fuel alcohol to petrol in certain proportions improves the running qualities of motor-car engines. The Sugar Manufacturers' Board has appointed a committee to investigate costs.

Empire Tanning Materials

THE British leather-making industry depends largely upon imports for the supply of its vegetable tanning materials. In the production of the materials imported the British Empire holds a strong position. In three of the principal kinds, myrabolams, gambier and wattle, the Empire has a virtual monopoly, and of the United Kingdom's total import in 1931 of 1,250,000 cwt. no less than 1,080,000 cwt. were of Empire origin. The chief materials obtained from outside the Empire are valonia and sumac, and there are others of smaller importance, such as divi-divi, etc. In addition to the crude materials there are large imports of concentrated tanning extracts in both liquid and solid form, the United Kingdom's imports of all kinds in a normal year amounting to about 1,200,000 cwt.

Oilfield Developments

SARAWAK, where an oilfield on British territory is operated by the Royal Dutch and Shell group, came under a voluntary restriction scheme last year, and produced about 25 per cent. less crude oil than in 1930. Production has never been pushed to its limit in this field, those concerned preferring to build up gradually a steady and increasing production in an economic manner. In other parts of the Empire efforts continue to be made to develop petroleum production, but on the whole with little success. In both Australia and New Zealand last year enough oil was produced to encourage operators to continue their search. The shale oil industry in New South Wales has recently been revived, and a moderate quantity of motor fuel from this source has been placed on the market. There is also a small production of shale oil in Tasmania. Because of the unattractive prices of refined products, the quantity of Trinidad crude refined in the colony was about 12 per cent. smaller than in 1931, being rather below 7,000,000 barrels. Refining capacity has been enlarged and methods improved in recent years; and should the market warrant it, much more crude oil could be treated than is the case.

Whale Oil Production

THE great developments which have marked the production of whale oil during the past few years reached a critical stage last year, when the world's production became greatly in excess of its consuming power, and the urgent need of some restriction on productivity was amply realised by producers and consumers alike. A couple of years ago the practice was introduced of accompanying the floating factories by transport vessels, whereby part of the catch could be shipped to Europe half-way through the season, and as a result production for 1930-31 rose to the high total of 615,000 tons, representing a nine-fold increase over the figure for 1919-20. In consequence prices touched the lowest level ever recorded, but despite this the unsold balance at the end of 1931 was in excess of the world's total production for 1922. Another aspect of the over production of whale oil is the serious competition offered to vegetable oils. The world's annual production of fats, fatty oils, tallow, lard and butter to-day is 14 million tons, the present production of whale oil being nearly 5 per cent. of the total. Of this total, it has been pointed out, five million tons can ordinarily be utilised in the soap and margarine industries, and whereas 10 years ago the world's production of whale oil which could replace these various fats and oils in the soap and margarine trade was but 2 per cent. of that total, to-day it is almost 15 per cent. of the animal and vegetable oils it can supplant.

Rubber Investigations at Singapore

THE rubber-growing dependencies are endeavouring to find new uses for rubber by which the accumulation of stocks might be absorbed. The latest effort, from Singapore, is a rubber paint made from pure plantation rubber, which, it is claimed, will adhere to almost any substance, and can compete in price with any other paint. A more ambitious scheme is the extraction of turpentine from rubber, which is being closely investigated. A new " rubber-cement-asphalt paving mixture " is being tried out in Malaya.

A New Industry for Trinidad

A COMPANY has been formed in Trinidad to manufacture de-odorised edible oils, lard substitute and laundry soap under arrangement with the Government, which has afforded tariff protection to this new industry but fixes the prices at which its products may be sold. In the last quarter of 1931 1,510,737 lb. of copra and 17,709 gallons of crude cocoanut oil were delivered to the factory, the output of which in the same period was 501,120 lb. of lard substitute and 77,850 gallons of edible oil.

Palm Oil in British Malaya

THE development of the oil-palm industry as a whole has enhanced the importance of Malaya's production of palm kernels, and there are now some 50,000 acres planted with oil-palm, which produce annually over 3,000 tons of palm-oil and some 500 tons of oil-palm kernals. The last-named figure is likely to increase very considerably in the next few years as larger areas of the palms reach bearing stage, and the quantity of nuts produced justifies estates in installing machinery for the extraction of the kernels. A Palm Oil Producers' Association of Malaya has just been formed to consider the problems and study the interests of this new but important industry.

Utilisation of Natural Gas

THE principal oil-producing province in Canada is Alberta, which produces some 90 per cent. of the oil got in the Dominion. Production in the Dominion in 1931 showed a slight advance on the previous year. The principal field was again Turner Valley, in Alberta; and the oil produced there was chiefly a very light natural petroleum accompanied by enormous yields of natural gas. The waste of this gas, to the extent recently of about 400,000,000 cu. ft. daily, has for some time been objectionable from an economic point of view, and last autumn the Alberta Government took drastic steps to deal with it; in addition, an order was issued forbidding drilling of any new wells whatever to the limestone, the formation in the Turner Valley field, whence the light petroleum and gas are obtained.

Soya Bean Cultivation

THE British Empire continues to furnish upwards of half the world's requirements in oilseeds and oils, but soya beans, olives, hempseed and sunflower seeds are grown on but an insignificant scale within the Imperial territories. So far as Great Britain is concerned the imports of olive oil are only small, and hempseed and sunflower seed are not among the oil seeds usually crushed in British seed-crushing mills. Soya beans, therefore, constitute the only item of considerable importance to the home trade of which supplies have to be sought from countries outside the Empire. In view of the commercial success which has followed the acclimatisation of the soya bean in the United States, it is therefore a matter for regret that more has not been achieved with this crop in British territory. The soya bean ranks second in importance among the worlds oilseeds, and has the additional advantage of being a rotation crop, and it is hoped that more may be done to develop it in the Sudan, South Africa and Australia. It has already been proved as a result of extensive experimental crops that the bean can be grown with success in Northern India and over a large part of South Africa. Experiments in Victoria and Queensland have also been entirely successful. The large scale production of the soya bean in any of these territories would be a great boon.

Letters to the Editor

The Editor welcomes expression of opinion and fact from responsible persons for publication in these columns. Signed letters are, of course, preferred, but where a desire for anonymity is indicated this will invariably be respected. From time to time letters containing useful ideas and suggestions have been received, signed with a nom-de-plume and giving no information as to their origin. Correspondence cannot be published in THE CHEMICAL AGE unless its authorship is revealed to the Editor.

Revision of the British Pharmacopœia

SIR,—A new edition of the British Pharmacopœia is to be available for sale on September 30 of this year, and by that date every manufacturer of one or more of the numerous products which are embodied in this work is legally responsible for seeing that his products conform to the requirements of the British Pharmacopœia, 1932.

For some reason, which is apparently so obscure that even the General Medical Council themselves cannot understand it, the sale of copies of this work to manufacturers of the products embodied in it is prohibited until the day on which by law the manufacturers are bound to supply products conforming to its requirements. Representations to the Privy Council, the Board of Trade, the Ministry of Health, and the General Medical Council have up to date produced no effect beyond the concession that one copy of the British Pharmacopœia, 1932, is available at the offices of the General Medical Council for inspection, and one copy has been sent (as a concession) to certain associations of manufacturers, in order that their members may consult it. The copies sent to these associations, however, have been accompanied by severe restrictions on their use. It therefore becomes necessary for my firm, and numbers of others, if they wish to have in advance information as to the requirements of the British Pharmacopœia, 1932, to send a representative to consult the copy at the offices of the General Medical Council, or that at the offices of the Association of British Chemical Manufacturers. Since the British Pharmacopœia deals with the methods of manufacture, the physical properties, and the purity of hundreds of different products, you will readily understand that, to say the least of it, the concession which has been granted is, to all intents and purposes, useless.

Chemical manufacturers in this country are faced with the following position: They will, as a whole, have in stock on September 30 some million pounds' worth of goods which conform to the requirements of the British Pharmacopœia issued in 1914. On October 1 manufacturers will be expected to supply goods to conform to the requirements of the British Pharmacopœia, 1932. The position therefore is that, in spite of the economic conditions which exist to-day, chemical manufacturers are, from no fault of their own, to be forced either to break the law or to lose thousands of pounds.

We do not know whether the attitude of the General Medical Council in this matter is forced upon them by the Privy Council by obscure legislation, or whether merely by a coy timidity which they will not feel strong enough to vanquish until after a summer holiday. We can only suggest that, if they have good reasons why this important publication should not be available at least six months before its provisions become law, they should say so, and that if there are no good reasons, they should take steps to make it available for at least this period in advance. This would now involve postponing the legal enforcement of the provisions of this publication.—Yours faithfully,

For MAY AND BAKER, LTD.,
N. G. BLENKINSOP, Director.

Battersea, S.W.11.

[We submitted a copy of Mr. Blenkinsop's letter to the registrar of the General Medical Council, from whom we have received the following reply.—ED., C.A.]

SIR,—The letter from May and Baker, Ltd., contains certain inaccuracies, and appears to have been written under misconceptions which it would be well to remove. The General Medical Council was aware of the difficulties which would arise for manufacturers if copies of the new Pharmacopœia were not available for consultation prior to the official publication in order that they might make the alterations in their preparations which would be necessitated by new standards. The Council accordingly took a legal opinion in order to ascertain if there was any way in which the convenience of manufacturers could be met without endangering the copyright of the Pharmacopœia, and was advised that there could be only one date of publication as defined by the Copyright Act, and that there was no provision in the Medical Council Act, 1862, for other than an official publication; further, that the risk of questions arising in regard to the standard of some drug mentioned in the Pharmacopœia which had been freshly included or amended by the new issue after the first or preliminary publication and before the so-called official publication, was not one that it would be advisable for the Council to undertake .

In these circumstances, there was no option but to adhere to the arrangements made in 1898 and 1914. These arrangements were that copies should be available at the offices of the Council in London, Edinburgh and Dublin for inspection by those interested three months before the official publication, and that a limited number of copies should be sent under certain reasonable restrictions to the professional journals and a limited number of persons for the purpose of review and criticism. This course has, therefore, been followed, and, so far from it being true that one copy of the Pharmacopoeia is available here for inspection, the number of copies was actually 60 and provision was made for a further 25 to be available should it be necessary. As a result, in the course of the first five days on which the book was open for inspection, 82 individuals and firms have called to see it, the maximum number in any one day being 28. It is no doubt true to say that when the Pharmacopœia is officially published on September 30 chemical manufacturers will have in stock preparations which conform to the requirements of the British Pharmacopœia, 1914, but by no means all of these will be obsolete under the issue of 1932. Manufacturers have been aware that changes in certain preparations would be necessitated by the publication of the British Pharmacopœia, 1932, and have, therefore, been reducing their stocks. There is no reason to suppose that there will not be time to make the necessary alterations in the three months at their disposal.

Chemical manufacturers are, or should have been, aware of the methods adopted to help them in 1914; if they were not, these could have been ascertained by them on application, and it would have been possible for them to make representations that the book should be open for inspection for a longer period than three months. No such representations were received. It should also be understood that there is more than one aspect of the matter. It was hoped that the volume would be completed at a date earlier than was eventually found to be possible. The book was made available for manufacturers on July 4, and will be on sale by the publishers on September 30. Had it been arranged to publish on November 30 or December 31 it would have meant that the book was not available for pharmaceutical and other students who were commencing their curriculum at the beginning of the October term, and their instruction might have had to be given on an obsolescent publication.

The General Medical Council has considered the matter carefully in all its aspects with a view, as far as possible, to meeting the convenience of those concerned without endangering the copyright of the property entrusted to it by statute, and it is a matter for regret to the Council that no legal method other than the one adopted has been found or suggested.—Yours faithfully,

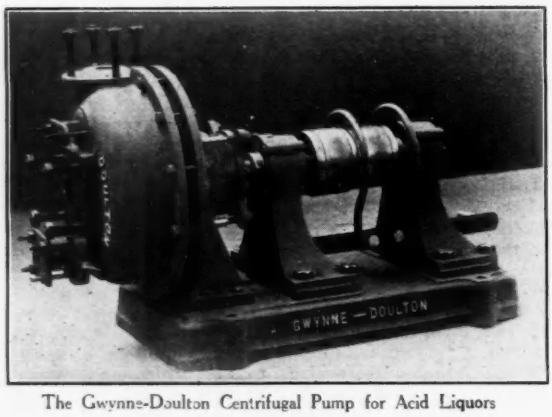
NORMAN C. KING.
Registrar, General Medical Council.
4 Hallam Street, W.1.

New Zealand Casein Output

THERE are six producers of casein in New Zealand having a total output of 65,096 cwts. in the fiscal year 1930-31 (ending March 31. Only a small part of this production is consumed domestically, the remainder being exported chiefly to the United Kingdom, Japan and Germany. It is estimated that only about 5 per cent. of the Dominion's skim milk and butter milk is utilised in casein manufacture.

Works Equipment News

Modern Aids for the Chemical and Allied Trades

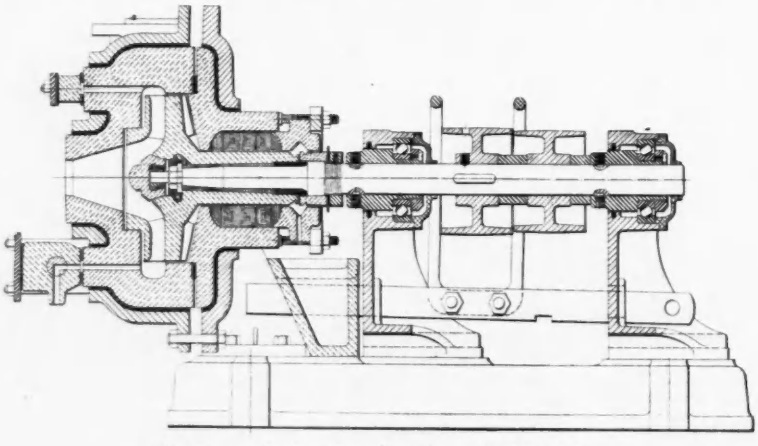


The Gwynne-Doulton Centrifugal Pump for Acid Liquors

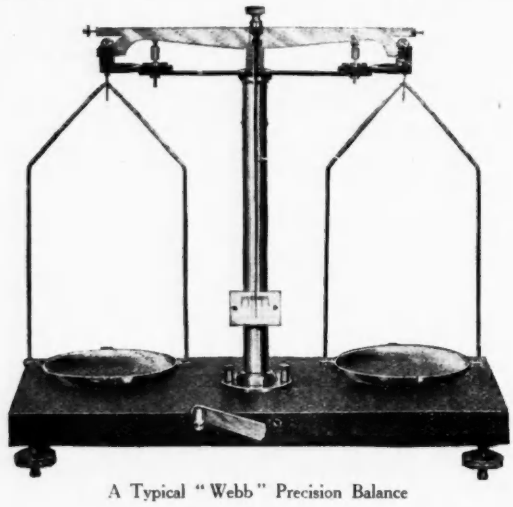
Pumps for Acid Liquors

PRIOR to the adoption of acid-proof chemical stoneware as a constructional material for pumps, the handling of large quantities of acid liquors at chemical works was distinctly troublesome, quite apart from corrosion difficulties arising as consequence of the unsatisfactory nature of the materials available. These reasons prompted the well-known firm of Doulton and Co. (with their experience of acid-proof stoneware) and Gwynnes Pumps, Ltd. (who have been actively engaged in pump design since 1849) to combine their joint experience in the design of a centrifugal pump which would efficiently serve the needs of chemical works, not only in conveying acid liquors from point to point but also where the continuous circulation of such liquors was in question.

The Gwynne-Doulton acid pump, which is illustrated externally and in section, has been especially designed for continuous operation and requires a minimum of attention. All the interior parts are made in Doulton acid-resisting stoneware, and no other material comes into contact with the liquid which is being pumped. It is consequently able to deal with corrosive substances and chemicals which attack iron, steel, lead, bronze and other special metals. The outside body of the casing is made in close-grained cast iron; the delivery branch is vertical and the suction branch is incorporated centrally in the detachable side cover. The impeller is of the single inlet shrouded type and made in stoneware; it is accurately ground and balanced to run entirely without vibration, and is permanently cemented to the spindle. The spindle is of mild steel, entirely covered by stoneware internally in the pump. Further, the impeller has an extended sleeve ensuring protection of the spindle where it passes through the stuffing box and gland. The bearings are of the ball thrust journal type, two in number, mounted on the bedplate, external to the pump. The stuffing box is of ample depth for the reception of the special packing and is provided with split stoneware gland. Rudimentary blades on the back of the impeller ensure that the gland is under vacuum during normal working conditions; in this way, leakage through the gland whilst the pump is in operation is entirely avoided. Two apertures are provided, closed with stoneware covers, to enable the interior of the pump to be vented, flushed, and drained. Such pumps can be supplied with a single pulley, with fast and loose pulleys and belt shifting gear, or alternatively on an extended bedplate for motor drive with complete pin type flexible coupling. At present three sizes are available, the diameter of the suction inlets being $1\frac{1}{4}$, 2 and 3 in. respectively. Whilst the $1\frac{1}{4}$ in. pump is capable of handling from 20 to 80 gallons per minute, the 3 in. pump will deal with 150 to 450 gallons, the gauge head being anything up to 70 feet. These figures are for equivalent duty on water, and due allowance must be made for the specific gravity and viscosity of the liquid being handled.



The Gwynne-Doulton Centrifugal Pump: Sectional View



A Typical "Webb" Precision Balance

British Made Balances

BALANCES and weighing instruments of all types are the speciality of Wm. A. Webb, Ltd. To those engaged on analytical work this firm has introduced a chain action balance which is built on the lines of well-known Continental makes. In this instrument the rider beam is replaced by a fine rolled-gold chain suspended to a vernier travelling over a scale reading from 0 to 0.1 grm., the vernier giving to 0.0001 grm. The movements of the chain are affected automatically without opening the case, or taking the balance out of action, and readings are taken direct from the vertical scale, thus avoiding the possibility of error and showing immense saving in time. The precision balance, which is illustrated, has a weighing capacity of 250 grms. and a sensitivity of 2 mgrm. The beam is of drawn duralumin, knife edges and planes of steel, and pillar and fittings of brass. All balances produced by this firm are British-made throughout and are guaranteed to conform to the degree of accuracy and sensitivity stipulated.

The "Kek" Centrifugal Grinding and Emulsifying Mill

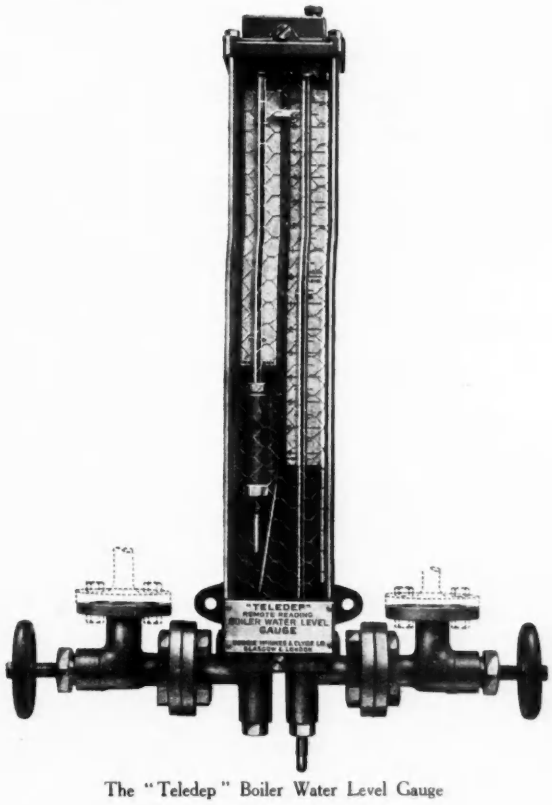
Centrifugal Grinding Mills

RECENTLY important developments in the design of the "Kek" mill for emulsifying work have been completed and results obtained with the new "Kek" emulsifier have shown marked improvements. The range of products treated to-day on the mill touches practically every industry, and a high output is obtained, together with simplicity of operation, economical running and remarkable adaptability. The Buffoline Noiseless Gear Co., Ltd., of Manchester, sole manufacturers of the "Kek" mill, have a test house fully equipped for carrying out tests on clients' materials and every day they are solving problems and helping clients in connection with grinding, blending and emulsifying. Such problems are continually arising in the manufacture of pharmaceutical preparations, paint and varnish, domestic polishes and foodstuffs.

The smallest mill produced by the company was originally made for research work, but nine out of every ten machines sold of this size are being used for commercial production. The machine complete is approximately 4 ft. 6 in. high and the galvanised metal receiving bin is 3 ft. across. The output of the machine on dry materials is between 80 and 200 lb. per hour. This small mill will take $\frac{1}{8}$ in. sugar crystals at the rate of 100 lb. per hour and produce an icing sugar of 140 mesh without sieving or dressing. Larger machines, namely No. 3 (13 in.) and No. 1 (26 in. diameter grinding discs) are in use in most of the large chemical works in this country. They are British throughout and are perfectly made and balanced.

A Boiler Water Level Gauge

SINCE the ordinary water gauge must be placed at the height of the water level in the boiler, it is often difficult to obtain a reading from water tube, vertical, waste heat and similar boilers without inconvenience. The "Teledep" boiler water level gauge, made by Dobbie, McInnes and Clyde, Ltd., however, enables readings to be taken at firing floor level or at an instrument board remote from and above or below the boiler. The apparatus consists of two chambers respectively connected at a definite vertical distance apart to the steam and water spaces of a boiler. Two tubes are led from this to the instrument where they are coupled on either side of a special inverted U-tube assembly of glass and metal. Suppose the two chambers, the tubes and the instrument to be filled with water with the exception of the upper part of the U-tube in which a quantity of air is trapped; then owing to the difference in head of water in the tubes, equilibrium is reached when the water levels in the U-tube produce a corresponding difference in head which is measured in inches (or millimetres) on a graduated scale. When the boiler is under steam, the tube or pipe leading to the steam space is kept full of water to a datum level by condensation, the other pipe being filled by the boiler water. The difference in head is then the distance of the boiler water level below the datum level in the pipe connected to the steam space, which distance is shown on the index gauge as so many inches above or below the mean boiler water level. This instrument is suitable for boiler pressures up to 1,000 lb. per sq. in., and is graduated from 7 in. below to 7 in. above the mean boiler water level. Special features include the advantage of there being incorporated no electrical or mechanical moving parts and no special liquids, water from the boiler itself being the sole medium; the addition of a secondary scale calibrated to indicate boiler pressure if required; the instrument's suitability for all types of boilers, and the elimination of gauge glass breakage due to high temperatures.



The "Teledep" Boiler Water Level Gauge

British Overseas Chemical Trade in June

A Noteworthy Increase in Exports

EXPORTS of chemicals, drugs, dyes and colours during June amounted to a total of £1,546,586, being £264,538 higher than the figures for June, 1931. Imports totalling £580,825 were lower by £335,549, and re-exports totalling £34,708 were lower by £11,946, as compared with June, 1931.

	Quantities. Month ended June 30. 1931.	1932.	Value. Month ended June 30. 1931.	1932.
			£	£
Imports.				
Acetic Anhydride .. cwt.	295	352	860	1,037
Acid, Acetic .. tons	842	735	31,177	22,397
Acid, Tartaric, including Tartrates .. cwt.	3,929	2,177	17,915	9,213
Bleaching Materials ,,	5,546	4,076	7,076	3,128
Borax .. .. ,,	30,075	10,107	17,328	4,896
Calcium Carbide .. ,,	46,159	23,627	28,117	14,771
Coal Tar Products, not elsewhere specified val.	—	—	3,913	813
Glycerine, Crude .. cwt.	1,072	100	1,385	170
Glycerine, Distilled ,,	2,374	379	4,495	673
Red Lead and Orange Lead .. .. cwt.	3,511	2,234	4,448	2,457
Nickel Oxide .. ,,	100	64	397	316
Potassium Nitrate (Saltpetre) .. .. cwt.	9,060	12,396	7,963	9,114
Other Potassium Compounds .. .. cwt.	78,020	38,881	33,442	20,539
Sodium Nitrate .. ,,	48,634	8	21,677	3
Other Sodium Compounds cwt.	42,106	19,395	24,142	11,367
Tartar, Cream of .. ,,	2,784	992	10,981	3,752
Zinc Oxide .. tons	572	11	12,750	206
Other Chemical Manufactures .. .. value	—	—	236,493	175,421
Quinine and Quinine Salts oz.	65,849	2,241	5,075	270
Bark Cinchona (Bark Peruvian, etc.) .. cwt.	1,672	736	6,264	3,358
Other Drugs .. value	—	—	135,751	73,444
Intermediate Coal Tar Products .. cwt.	53	20	618	270
Alizarine and Alizarine Red .. .. cwt.	4	—	214	—
Indigo, Synthetic ,,	—	—	—	—
Other Dyestuffs .. ,,	3,012	2,941	64,655	68,606
Cutch .. .. ,,	4,325	539	6,997	590
Other Extracts for Dyeing cwt.	2,130	636	7,282	2,621
Indigo, Natural .. ,,	—	19	—	304
Extracts for Tanning ,,	89,030	76,154	77,020	56,442
Barytes, Ground .. ,,	47,648	21,000	9,468	4,021
White Lead (Dry) ,,	12,174	3,479	16,577	4,452
Other painters' colours and materials .. cwt.	115,071	67,902	130,385	86,084
TOTAL .. value	—	—	925,374	580,825
Exports.				
Acid, Sulphuric .. cwt.	1,341	3,764	1,587	2,338
Acid, Tartaric, including Tartrates .. cwt.	609	707	3,005	3,620
Ammonium Chloride tons	224	347	4,012	5,436
Ammonium sulphate ,,	14,987	43,405	106,862	200,693
Bleaching Powder (Chloride of Lime) .. cwt.	39,657	49,935	11,436	15,257
COAL TAR PRODUCTS—				
Anthracene .. cwt.	—	276	—	103
Benzol and Toluol gal.	2,102	132,693	181	12,048
Carbolic Acid (Crude)	7,451 gal.	8,219 gal.	548	829
Carbolic Acid (Crystals) cwt.	2,839	386	6,842	1,435
Cresylic Acid .. gal.	59,600	63,962	6,220	6,290
Naphtha .. ,,	2,532	4,475	268	397
Naphthalene (excluding Naphthalene Oil) cwt.	5,941	14,772	1,527	3,181
Tar Oil, Creosote Oil, etc. .. .. gal.	2,786,842	600,000	62,396	11,739
Other Sorts .. cwt.	24,776	36,025	10,024	8,090
COAL TAR PRODUCTS	—	—	88,006	44,112
Copper, Sulphate of tons	4,637	6,645	83,522	104,462
Disinfectants, Insecticides, etc. .. .. cwt.	33,143	26,112	71,449	53,669
Glycerine, Crude .. cwt.	1,866	970	2,412	1,031
Glycerine, Distilled ,,	7,576	5,787	18,134	11,924
Potassium Chromate and Bichromate .. cwt.	1,029	1,463	2,118	3,604
Potassium Nitrate (Saltpetre) .. .. cwt.	1,068	2,179	1,861	3,758
Other Potassium Compounds .. .. cwt.	463	1,420	6,997	8,740
Sodium Carbonate, including Crystals, Ash and Bicarbonate .. cwt.	288,408	351,336	76,001	96,272
Caustic Soda	98,064	203,164	67,596	126,435
Sodium Chromate and Bichromate .. cwt.	1,563	1,741	2,671	3,439
Sodium Sulphate, including Salt Cake .. cwt.	13,531	72,137	2,300	9,646
Other Sodium Compounds cwt.	41,823	193,778	49,599	119,420
Zinc Oxide .. tons	261	843	5,564	16,890
Other Chemical Manufactures .. .. value	—	—	185,761	234,213
Quinine and Quinine Salts oz.	94,927	130,407	10,008	15,946
Other Drugs .. value	—	—	185,933	195,789
Dyes and Dyestuffs (Coal Tar) .. .. cwt.	9,518	9,693	83,062	87,098
Other Dyestuffs .. ,,	4,615	14,749	5,388	11,767
Barytes, Ground .. cwt.	2,741	2,006	1,109	690
White Lead (Dry) ,,	2,253	2,114	3,884	3,621
Paints and Colours in paste form .. .. cwt.	20,180	17,082	36,849	27,655
Paints and Enamels prepared .. .. cwt.	34,546	24,970	104,757	73,283
Other painters' colours and materials .. cwt.	35,441	37,092	60,165	65,778
TOTAL .. value	—	—	1,282,048	1,546,586
Re-Exports.				
Acid, Tartaric, including Tartrates .. cwt.	68	34	401	256
Borax .. .. ,,	244	88	170	64
Coal Tar Products, not elsewhere specified value	—	—	7	23
Potassium Nitrate (Saltpetre) .. .. cwt.	45	1,264	58	701
Sodium Nitrate .. ,,	1,281	14	627	9
Tartar, Cream of .. ,,	566	177	2,387	841
Other Chemical Manufactures .. .. value	—	—	9,372	8,176
Quinine and Quinine Salts oz.	7,546	4,436	754	558
Bark Cinchona (Bark Peruvian, etc.) .. cwt.	315	214	3,843	2,096
Other Drugs .. value	—	—	23,503	19,448
Cutch .. .. cwt.	715	392	1,093	485
Other Extracts for Dyeing	45	22	266	80
Indigo, Natural .. ,,	12	4	403	72
Extracts for Tanning ,,	1,215	859	1,405	940
Painters' colours and materials .. .. cwt.	1,118	488	2,051	764
TOTAL .. value	—	—	46,654	34,708

Acetic Acid Imports

DURING the first three months of 1932 British imports of acetic acid were almosts two and a half times as large as in the 1931 quarter, 3,205 tons worth £126,109 being received in the 1932 period and 1,301 tons, valued at £48,593 in the 1931 period. Imports of acetic anhydride during the same periods remained fairly stable at 1,598 cwt. worth £4,740 in 1932 and 1,545 cwt., valued at £4,819 in 1931.

News from the Allied Industries

Artificial Silk

A PETITION FOR THE WINDING-UP of the British Netherlands Artificial Silk Co., Ltd., presented on July 6 by a Dutch engineer, is to be heard in London on July 18.

Coal Distillation

THE BUSSEY COAL DISTILLATION CO., LTD., states in a circular to shareholders that its Glenboig plant has been sold to Financial and General Trust, Ltd. The new owners will operate the plant on such terms that they will give the company full advantage of all their experiences. Through the arrangements now made, sufficient cash is in hand to pay off pressing liabilities and keep the company in existence until the results of the operation of the plant on a commercial basis are known. Work has already commenced at Glenboig, and it is hoped to have six retorts in operation before the end of this year.

Glue Trade

PRESIDING AT THE MEETING of British Glues and Chemicals, Ltd., held on July 7, Mr. T. Walton said the results were a definite improvement, showing a profit of £31,467, against £15,029 last year. Liquid assets exceeded liabilities by £250,000. There would be no further payment of Preference dividends at the end of this month, and future distributions would depend on circumstances. Replying to a shareholder who thought, having regard to the financial position of the company, the board should have acted more generously towards the Preference shareholders, the Chairman said that in these difficult times great caution had to be observed. The report was unanimously adopted.

Iron and Steel

THERE WERE SIXTY-NINE FURNACES in blast at the end of June, the same number as at the beginning of the month. The production of pig iron in June amounted to 311,400 tons, compared with 315,300 tons in May and 323,800 tons in June, 1931. Production includes 75,700 tons of hematite, 130,100 tons of basic, 85,500 tons of foundry, and 13,200 tons of forge pig iron. The output of steel ingots and castings in June amounted to 405,300 tons, compared with 416,900 tons in May and 428,900 tons in June, 1931. The figures for May, 1932, and June, 1931, were affected by Whitsun holidays.

Mineral Oil

A PROPOSAL HAVING BEEN SUBMITTED for the restriction of Rumanian production for ten years (it has not been entirely accepted by the Rumanian delegates because they wish to wait and see what may be done with regard to Russian producers), the Oil Conference resumed its sessions in Paris on July 8, but only British and American interests were represented. The principal subject under discussion was an increase of 20 per cent. in wholesale prices.

THE BRITISH-BORNEO PETROLEUM SYNDICATE, LTD., announces that an arrangement has been entered into with the Anglo-Persian Oil Co., Ltd., by which that company will participate jointly with the syndicate in the exploration of the Elm Concession, in the State of Brunswick, under the technical direction of the Anglo-Persian Oil Co., Ltd. The syndicate owns the entire capital of a company formed in Germany to take up the concession referred to above. The concession is over 54 square miles in extent.

The Australian Chemical Institute

The New Royal Charter

THE granting, by his Majesty the King, of a Royal Charter to the Australian Chemical Institute marks an important stage in the development of the leading chemical body in the Australian Commonwealth. Founded in 1917 as a result of the advocacy and enthusiasm of Sir David Masson, who became its first president, the Institute includes in its membership chemists and chemical engineers from all parts of Australia. Executive control rests with a council consisting of the presidents of the various state branches, with an hon. treasurer and hon. secretary. The activities in the past have been mainly devoted towards consolidating the profession into a body of sufficient strength and standing to further the mutual interests of chemists.

The policy of the early leaders of the Institute included two main aims: Firstly, that the qualifications required for membership should eventually be equal to those required for membership of the Institute of Chemistry of Great Britain and Ireland, and, secondly, that a Royal Charter of incorporation should be sought. They realised at the outset that the best interests of the profession would be served by the development of a high degree of efficiency amongst chemists, and to this end the standard of qualifications required for admission has been progressively raised until at the present time it closely approaches that of the British Institute.

Five Years' Delay

Realising, too, the importance of obtaining official recognition of the Institute and of establishing the profession in the public estimation as one in which the best traditions and service and professional etiquette were observed, the council early gave consideration to the standing of the Institute in the community. Steps were taken to ascertain the difficulties that lay in the way of obtaining a Royal Charter, and largely through the instrumentality of Mr. A. E. Leighton, who was a representative of the British Institute and also an officer of the Australian body, the course of action that has led to a successful conclusion was agreed upon, and with the assistance of the Commonwealth Government, a petition was presented to the King in 1925. This petition was referred by the Privy Council to the Institute of Chemistry of Great Britain and Ireland for comment, and some delay occurred until in 1930 Dr. Rivett and Dr. Callister, whilst in England, discussed the matter with representatives of the home Institute and paved the way for the ultimate granting of the charter this year. Many members of the Institute besides those mentioned have assisted in this work, notably, of course, the council and particularly the hon. general secretary, Dr. Cooksey, and the hon. solicitor, Mr. R. Houston.

Points from the Charter

Amongst the most important of the powers, objects and privileges conferred by the Royal Charter, the full text of which was published in a recent issue of the "Chemical Engineering and Mining Review," the official journal of the Institute, are the injunctions to promote the science and practice of chemistry in all its branches and the usefulness and efficiency of persons engaged therein, to watch over and promote the interests of the profession of chemistry generally and to promote honourable practice and repress malpractice. Mention is made of the object of increasing the confidence of the mercantile and general community on the employment of recognised technical analysts and chemical advisers by admitting to the Institute such persons only as shall have satisfied the council that they have a satisfactory knowledge of both the theory and practice of chemistry and for that purpose power is given to hold examinations and award certificates.

One effect of the granting of the charter is that the Institute is now incorporated as an Australian organisation, whereas formerly, owing to the absence of the federal company law, it could be registered in one State only.

The inauguration of this chartered body with its obligation to maintain a high standard of professional integrity and technical learning amongst its members is an event of importance in establishing the status of the profession of chemistry in the Commonwealth, and it is felt that the action of His Majesty in granting a Royal Charter to the Australian Chemical Institution is a welcome sign of the growing public appreciation of the value of chemists in that country.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

The following notes on the chemical market conditions in Great Britain are based on direct information supplied by the British manufacturers concerned, and unless otherwise qualified the figures quoted apply to fair quantities, net and naked at makers' works. Where no locality is indicated, the prices are general for the United Kingdom. Particulars of the London chemical market are specially supplied to THE CHEMICAL AGE by R. W. Greeff and Co., Ltd., and Chas. Page and Co., Ltd., and those of the Scottish chemical market by Chas. Tennant and Co., Ltd.

CONDITIONS in the London chemical market remain practically unchanged as far as values are concerned, with the demand if anything rather better than has been the case for some time. Prices for coal tar products are unchanged. Allowance being made for seasonal influences, a moderate business has been done on the Manchester chemical market. Immediate prospects of the volume of trade expanding to any material extent are rather remote, but there is a disposition to regard the outlook a little more hopefully in view of the outcome of the Lausanne Conference. Meanwhile, the tone of the market this week has been generally steady and only minor alterations in prices have to be reported. Business in Scotland has been quiet due to the approaching Glasgow Fair holidays.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £37 5s. to £39 5s.; pure 80% £38 5s. to £40 5s.; tech., 40%, £19 15s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. SCOTLAND: Glacial 98/100%, £48 to £50; pure 80%, £38 5s.; tech. 80%, £37 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in one-ton lots upwards.

ACID, CHROMIC.—11d. per lb., less 2½% d/d U.K.

ACID, CITRIC.—1s. 0½d. per lb. LONDON: 1s. 1½d., less 5%. MANCHESTER: 1s. 0½d.

ACID, CRESYLIC.—97/99%, 1s. 6d. to 1s. 8d. per gal.; 99/100%, 1s. 9d. to 2s.

ACID, FORMIC.—LONDON: £50 per ton.

ACID, HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £20 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £45 10s. per ton in casks, £48 10s. to £52 10s. in kegs. SCOTLAND: 98/100%, £49 to £52 ex store. MANCHESTER: £48, ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations: 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. 0½d. per lb. SCOTLAND: B.P. crystals, 1s. 1d. to 1s. 1½d., less 5% carriage paid. MANCHESTER: 1s. 0½d.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON: £8 5s. to £9 10s. per ton. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb. d/d.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £36 per ton; powdered, £38, in 5-cwt. casks d/d U.K. stations or f.o.b. U.K. ports.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £19 to £20. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton, carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

ANTIMONY OXIDE.—SCOTLAND: Spot, £22 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 4d. to 1s. 6d. per lb. according to quality.

ARSENIC.—LONDON: £24 10s. c.i.f. main U.K. ports for imported material; Cornish nominal, £26 10s. f.o.r. mines. SCOTLAND: White powdered £27 ex wharf; spot, £27 10s. ex store. MANCHESTER: White powdered Cornish, £26 at mines.

ARSENIC SULPHIDE.—Yellow 1s. 6d. to 1s. 8d. per lb.

BARIUM CHLORIDE.—£11 to £11 10s. per ton.

BISULPHITE OF LIME.—£7 10s. per ton f.o.r. London, packages free.

BLEACHING POWDER.—Spot 35/37% £7 10s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 15s. in 5/6 cwt. casks.

BORAX, COMMERCIAL.—Granulated £15 10s. per ton, powder £17, packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—3s. 6d. to 3s. 9d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot £5 5s. to £5 15s. per ton d/d station in drums.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—5d. to 5⅞d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £55 per ton, drums extra.

CHROMIUM OXIDE.—10d. to 10½d. per lb. according to quantity d/d U.K. Green 1s. 2d. per lb.

CHROMETAN.—Crystals 3¾d. per lb. Liquor £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r., or ex works.

CREAM OF TARTAR.—LONDON: £5 to £5 3s. 6d. per cwt.

FORMALDEHYDE.—LONDON: £28 to £30 per ton. *£30. SCOTLAND: 40%, £28 10s. ex store.

HYDROGEN PEROXIDE.—LONDON: *100 vols. 10d. per lb.

LAMPBLACK.—£46 to £50 per ton.

LEAD, ACETATE.—LONDON: White, £37 to £38 per ton. Brown £1 per ton less. SCOTLAND: White Crystals £40 to £41 c.i.f. U.K. ports. Brown £1 per ton less. MANCHESTER: White, £35; Brown, £33 10s.

LEAD NITRATE.—£28 per ton. MANCHESTER: £27 10s.

LEAD, RED.—SCOTLAND: £28 10s. per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £40 per ton carriage paid.

LITHOPONE.—30%, £20 to £22 per ton.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYLATED SPIRIT.—61 O.P. Industrial 1s. 8d. to 2s. 3d. gal. Pyridinised Industrial, 1s. 10d. to 2s. 5d. Mineralised, 2s. 9d. to 3s. 3d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£38 per ton d/d.

NICKEL SULPHATE.—£38 per ton d/d.

POTASH, CAPSTIC.—LONDON: £42. MANCHESTER: £41.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5¾d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CARBONATE.—SCOTLAND: 96/98% spot £28 per ton ex store. LONDON: £31 10s. to £32. MANCHESTER: £31.

POTASSIUM CHLORATE.—3¾d. per lb. export London in 1-cwt. kegs. LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100% powder, £34. MANCHESTER: £36.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £28 per ton c.i.f U.K. ports. Spot £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8½d. to 9d. per lb. SCOTLAND: B.P. crystals, 8½d. MANCHESTER: Commercial, 8¼d.; B.P., 8¾d.

POTASSIUM PRUSSIATE.—LONDON: 8½d. to 9d. per lb. SCOTLAND: Yellow spot material, 8½d. ex store. MANCHESTER: Yellow, 8½d.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d in barrels.

SODA ASH.—58% spot, £6 per ton f.o.r. in bags, special terms for contracts.

SODA, CAUSTIC.—Solid 76/77° spot £14 10s. per ton d/d station. SCOTLAND: Powdered 98/99% £17 10s. in drums, £18 15s. in casks. Solid 76/77% £14 10s. in drums 70/72% £14 12s. 6d. carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £12 15s. to £14 contracts.

SODA CRYSTALS.—Spot £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£21 to £22 per ton.

SODIUM BICARBONATE.—Refined spot £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous 5d. per lb. LONDON: 4d. per lb. with discounts for quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. less 1 to 3½% contracts, 4d. spot lots.

SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.

SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—2¾d. per lb. LONDON: £29 per ton. MANCHESTER: £29.

SODIUM CHROMATE.—3⅛d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals £15 ex station 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.
SODIUM NITRITE.—Spot £19 to £22 per ton d/d station in drums.
SODIUM PERBORATE.—LONDON: 10d. per lb.
SODIUM PHOSPHATE.—£13 to £15 per ton.
SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 6d.
SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground Spot £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d.
SODIUM SULPHIDE.—Solid 60/62% Spot £10 15s. per ton d/d in drums. Crystals Spot £7 15s. per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.
SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot £9 10s. d/d station in bags.
SULPHATE OF COPPER.—MANCHESTER: £16 per ton f.o.b.
SULPHUR.—£12 5s. per ton. SCOTLAND: Flowers, £12 10s.; roll, £12; rock, £9. Ground American, £12 ex store.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.
VERMILION.—Pale or deep, 5s. 2d. to 5s. 5d. per lb.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINC SULPHATE.—LONDON and SCOTLAND: £12 per ton.
ZINC SULPHIDE.—1s. to 1s. 2d. per lb.

Pharmaceutical and Fine Chemicals

The following changes in the prices of pharmaceutical and fine chemicals are announced:—

ACID, CITRIC.—1s. 0¼d. per lb.
ACID, TANNIC, B.P.—3s. 2d. to 3s. 6d. per lb.
ACID, TARTARIC.—1s. 0¼d. per lb.
IODINE, RESUB., B.P.—20s. 8d. to 26s. per lb.
IODOFORM B.P.—23s. 9d. to 29s. 3d. per lb.
POTASSIUM IODIDE, B.P.—17s. 10d. to 21s. 7d. per lb.
QUININE SULPHATE.—2s. 4d. per oz.
SODIUM IODIDE.—19s. 4d. to 23s. 9d. per lb.

Intermediates and Dyes

IN the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID, BENZOIC, B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100% d/d buyer's works.
ACID, SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.
BENZIDINE BASE.—Spot, 2s. 5d. per lb. 100% d/d buyer's works.
o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
p-CRESOL.—34.5° C.—1s. 9d. per lb., in ton lots.
DICHLORANILINE.—2s. 2d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8½d. per lb.
DINITROTOLUENE.—48/50° C., 8¼d. per lb.; 66/68° C., 9d. per lb.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
a-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
B-NAPHTHOL.—Spot, £75 per ton in 1-ton lots, d/d buyer's works.
a-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.
B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 10d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra.
NITRONAPHTHALENE.—9d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.
o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—Spot, 1s. 9d. per lb., d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 6d. per lb., 100%.

Coal Tar Products

ACID, CARBOLIC (CRYSTALS).—5½d. to 6¾d. per lb. Crude, 60's 1s. 5¼d. to 1s. 6¼d. per gal. SCOTLAND: Sixties, 1s. 7d. to 1s. 8d.
ACID, CRESYLIC.—99/100, 1s. 7d. per gal.; B.P., 2s. to 2s. 2d.; Refined, 1s. 9d. to 1s. 11d.; Pale, 98%, 1s. 6d. to 1s. 7d.; Dark, 1s. 4d. to 1s. 4½d. LONDON: 98/100%, 1s. 6d. Dark 95/97%, 1s. 4d. SCOTLAND: Pale 99/100%, 1s. 3d. to 1s. 4d.; 97/99%, 1s. to 1s. 1d.; dark 97/99%, 11d. to 1s.; high boiling acid, 2s. 6d. to 3s.
BENZOL.—At works, crude 7d. to 7½d. per gal. Standard motor, 1s. 2d. to 1s. 3d.; 90%, 1s. 3d. to 1s. 4d. Pure, 1s. 6d. to 1s. 7d. LONDON: Motor, 1s. 5½d. SCOTLAND: Motor, 1s. 3½d. to 1s. 4½d.; 90%, 1s. 9½d. to 1s. 10½d.
CREOSOTE.—Standard for export, 4¾d. to 5d. nett per gal. f.o.b. for Home, 3¾d. d/d. LONDON: 3d. to 3½d. f.o.r. North; 4d. to 4½d. London. MANCHESTER: 3¾d. to 4¾d. SCOTLAND: Specification oils, 3¾d. to 4¼d.; washed oil, 4d. to 4½d.; light, 3¾d. to 4¼d.; heavy, 4¾d. to 5d.
NAPHTHA.—Solvent, 90/160, 1s. 4d. to 1s. 5d. per gal.; 95/160, 1s. 4½d.; 90/190, 1s. 1d. to 1s. 2d. LONDON: Solvent, 1s. 1½d. to 1s. 2d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160, 1s. 3d. to 1s. 3½d.; 90/190, 1s. 1d. to 1s. 2d.
NAPHTHALENE.—Purified crystals, £9 10s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 65s. to 70s.
PYRIDINE.—90/140, 3s. 9d. per gal.; 90/160, 4s. to 4s. 6d.; 90/180, 2s. to 2s. 6d. SCOTLAND: 90/160%, 4s. to 5s.; 90/220%, 3s. to 4s.
REFINED COAL TAR.—SCOTLAND: 4¾d. to 5d. per gal.
TOLUOL.—90%, 2s. 2d. per gal.; Pure, 2s. 6d.
XYLOL.—1s. 9d. per gal.; Pure, 1s. 11d.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 per ton. Grey, £11 10s. to £12. Liquor, brown, 30° Tw., 6d. per gal. MANCHESTER: Brown, £8; grey, £11 10s.
ACETIC ACID, TECHNICAL, 40%.—£16 15s. to £18 per ton.
ACETONE.—£63 to £65 per ton.
AMYL ACETATE, TECHNICAL.—95s. to 110s. per cwt.
CHARCOAL.—£7 10s. to £12 per ton.
IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gal.
WOOD CREOSOTE.—1s. to 2s. 6d. per gal., unrefined.
WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gal. Solvent, 3s. 9d. to 4s. 9d. per gal.
WOOD TAR.—£2 to £6 per ton.
BROWN SUGAR OF LEAD.—£32 per ton.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—During the week the export market has continued quiet and the prices are unchanged. In the home market substantial quantities have been booked for next season's delivery at the price of £5 5s. per ton delivered nearest station in 6-ton lots. British sellers have announced the price of £5 5s. per ton for neutral sulphate, basis 20.6 per cent. nitrogen in 6-ton lots carriage paid to buyers' nearest station for delivery up to June 30, 1933, but they reserve to themselves the right to raise or reduce this price at any time without notice.

NITRATE OF SODA.—The price for imported nitrate remains unchanged at £9 per ton delivered in 6-ton lots; British nitrate remains at £8 16s. per ton delivered in 6-ton lots.

NITRO-CHALK.—The price remains unchanged at £7 5s. per ton delivered in 6-ton lots.

Calcium Cyanamide

Prices for Season 1932-33

THE prices of calcium cyanamide 20.6 per cent. nitrogen, powdered and oiled, packed in paper lined bags of 2 cwt. gross weight for net, for the season 1932-33 is announced as follows:—July/September delivery, £6 15s. per ton, carriage paid to any railway station in Great Britain in lots of 4 tons and over; October/December, £6 17s. 6d.; January/June, £7. quantities of less than 4 tons, but not less than 2 tons an additional 5s. per ton will be charged. For quantities of less than 2 tons, but not less than 1 ton an additional 10s. per ton will be charged. Cyanamide is sold on the basis of 20.6 per cent. nitrogen with no charge for excess, but with an allowance for deficiency, if any, in analysis, as follows:—1s. per ton if the percentage of nitrogen is under 20.6 per cent. but not less than 20.5 per cent. 2s. per ton if the percentage of nitrogen is under 20.5 per cent. but not less than 20.25 per cent. 4s. per ton if the percentage of nitrogen is under 20.25 per cent., but not less than 20.00 per cent.

Inventions in the Chemical Industry

Specifications Accepted and Applications for Patents

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Accepted with Date of Application

CHLORINATION OF MATERIALS CONTAINING IRON SULPHIDE. R. F. Bacon. Feb. 25, 19930. 375,795.

CHLORINATION OF IRON SULPHIDE CONTAINING MATERIALS. R. F. Bacon. Feb. 26, 1930. 375,798.

IRON-TITANIUM ALLOYS. F. Krupp Akt.-Ges. June 26, 1930. 375,776.

PRODUCTION OF A SOLUTION OF COPPER SULPHATE. E. Platone. Mar. 24, 1930. 375,840.

PROCESS OF MELTING AND REFINING HIGH BOROSILICATE GLASSES. Corning Glass Works. May 19, 1930. 375,806.

MANUFACTURE AND PRODUCTION OF DERIVATIVES OF POLYHYDRIC ALCOHOLS. J. Y. Johnson (*I. G. Farbenindustrie*). Mar. 26, 1931. 375,842.

PROCESS FOR MANUFACTURING CONDENSATION PRDDUCTS. I. Freidl, C. Rosen and K. Rutter. Mar. 27, 1930. 375,843

PRODUCTION OF AMINO-ANTHRAQUINONE DERIVATIVES. Imperial Chemical Industries, Ltd., R. J. Loveluck and J. Thomas. Mar. 30, 1931. 375,848.

EXPLOSIVE COMPOSITIONS. E. I. Du Pont de Nemours and Co. Apr. 3, 1930. 375,824.

MANUFACTURE OF BLEACHING POWDER. A. Carpmael (*I. G. Farbenindustrie*). Apr. 1, 1931. 375,827.

PREPARATION OF METALLIFEROUS SULPHURISED DERIVATIVES OF PHENOLS. Chemische Fabrik vorm. Sandoz. Apr. 8, 1930. 375,885.

PROCESS AND APPARATUS FOR THE COKING OF PITCH AND SIMILAR BITUMINOUS SUBSTANCES. H. D. Elkington (*Ges. fur Teerverwertung*). Apr. 28, 1931. 375,928.

DISTILLATION, CALCINATION OR HEAT TREATMENT OF COAL, SHALE, PEAT, WOOD, AND OTHER SUITABLE FRAGMENTARY SOLID AND/OR SEMI-SOLID MATERIALS. S. Moore. Apr. 30, 1931. 375,930.

RECOVERY OF MOLYBDENUM FROM MIXTURES OF MOLYBDENUM OR MOLYBDENUM COMPOUNDS WITH OTHER METALS OR METAL COMPOUNDS. J. Y. Johnson (*I. G. Farbenindustrie*). May 18, 1931. 375,948.

PRODUCTION OF A FERTILISER MIXTURE AND THE PRODUCT PRODUCED THEREBY. Kali-Forschungs-Anstalt Ges. Nov. 12, 1930. 375,965.

MANUFACTURE AND PRODUCTION OF COMPOUND GLASS. J. Y. Johnson. (*I. G. Farbenindustrie*). June 6, 1931. 375,972.

PRODUCTION OF RUBBER CEMENTS. Naugatuck Chemical Co. July 25, 1930. 376,022.

PROCESS FOR PRODUCING ACETALDEHYDE AND ACETIC ACID FROM ACETYLENE. Gutehoffnungshütte Oberhausen. Aug. 2, 1930. 376,045.

PROCESS FOR DE-COLOURISING HEAVY SPAR. Metallges A.-G., and M. Schiechel. Nov. 25, 1930. 376,080.

PRODUCTION OF PATTERN EYYECTS ON ACETATE SILK. Hebelein and Co. A.-G. Sept. 22, 1930. 376,097.

MANUFACTURE OF WATER-RESISTANT ABRADANTS. I. G. Farbenindustrie. Oct. 18, 1930. 376,121.

PRODUCTION OF MIXED FERTILISERS. Ruhrchemie A.-G. Nov. 8, 1930. 376,147.

PROCESS FOR THE MANUFACTURE OF ARTIFICIAL STONES FROM LIME. K. Höller and S. Schless. Nov. 10, 1931. 376,150.

METHOD FOR THE PRODUCTION OF SOLID DI-AMMONIUM PHOSPHATE FROM IMPURE PHOSPHORIC ACID. Stockholms Superfostat Fabriks Aktiebolag. Dec. 9, 1930. 576,174.

PROCESS FOR PURIFYING PHOSPHATIC LIQUIDS. Naamoloze Vennootschap de Bataafsche Petroleum Mootschappij. Dec. 23, 1930. 376,178.

Complete Specification open to Public Inspection

SULPHONATED CONDENSATION PRODUCTS. Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reunies Etablissements Kuhlmann. June 30, 1931. 26105/31.

PROCESS FOR THE UTILISATION OF NITROSYL CHLORIDE. Kali-Forschungs-Anstalt Ges. July 4, 1931. 6833/32.

PROCESS FOR TREATING THE RESIDUEP OBTAINED IN THE CRACKING OF OIL. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. June 29, 1931. 15684/32.

PROCESS FOR THE PRODUCTION OF ANTIMONATES OF THE ALKALI AND ALKALINE EARTH METALS. I. G. Farbenindustrie. July 3, 1931. 16903/32.

ESTERIFICATION OF CELLULOSE. Dr. G. Jayme. June 30, 1931. 17102/32.

MANUFACTURE OF BENZYL CELLULOSE. I. G. Farbenindustrie. June 29, 1931. 18432/32.

CONVERSION OF MASSES OF WAXES OR WAX-LIKE MATERIALS INTO COMPARATIVELY SMALL PIECES OF ARBITRARY SIZE. I. G. Farbenindustrie. July 1, 1931. 18433/32.

MANUFACTURE OF CARBO-CYANINE DYES. Kodak, Ltd. June 30, 1931. 18533/32.

MANUFACTURE OF SALTS OF ORGANIC ARSONIC ACIDS. I. G. Farbenindustrie. July 4, 1931. 18888/32.

MANUFACTURE OF VARNISHES, LACQUERS, PUTTY MASSES, AND THE LIKE. Deutsche Hydrierwerke A.-G. July 4, 1931. 18905/32.

Applications for Patents

PRODUCTION OF SULPHURIC ACID ESTERS OF GLUCOSIDES. H. T. Böhme A.-G. July 6. (Germany, July 13, '31.) 19141.

PRODUCTION OF MINERAL ACID ESTERS OF GLUCOSIDES. H. T. Böhme A.-G. July 7. (Germany, Aug. 6, '31.) 19212.

LIQUID HYDROCARBON OILS. W. S. Calcott. July 8. 19419, 19420.

ALUMINIUM ALLOYS. H. T. Davies. July 8. 19383.

MANUFACTURE OF VARNISHES, LACQUERS, ETC. Deutsche Hydrierwerke A.-G. July 4. (Germany, July 4, '31.) 18905.

MANUFACTURE OF INORGANIC SUBSTANCES. H. Dreyfus. July 4. 18846.

LIQUID HYDROCARBON OILS. E. I. Du Pont de Nemours and Co., and H. W. Ellis. July 8. 19418.

COLLOIDAL SUSPENSIONS FOR INSECTICIDES. Einstein's Electro Chemical Processes, Ltd. July 9. 19471.

MANUFACTURE OF VAT DYESTUFF DERIVATIVES. D. A. W. Fairweather, Imperial Chemical Industries, Ltd., and R. F. Thompson. July 8. 19417.

CLARIFICATION OF WATER. E. D. Grant and J. P. Robert. July 9. 19466.

PRODUCTION OF METALS FROM THEIR DIFFICULTLY-REDUCIBLE COMPOUNDS. H. A. Green. July 7. 19198.

MANUFACTURE OF SPONGY RUBBER, ETC. L. E. Howard. July 8. 19345.

PHOTOGRAPHIC EMULSIONS. I. G. Farbenindustrie. July 4. (Germany, July 4, '31.) 18887.

MANUFACTURE OF SALTS OF ORGANIC ARSENIC ACID. I. G. Farbenindustrie. July 4. (Germany, July 4, '31.) 18888.

MANUFACTURE OF PHOTOGRAPHIC EMULSIONS. I. G. Farbenindustrie July 7. (Germany, July 7, '31.) 19244.

SAFETY DEVICE FOR VESSELS, ETC., CONTAINING FLUIDS UNDER PRESSURE. Imperial Chemical Industries, Ltd., and G. F. Lake. July 4. 18914.

PLASTIC MATERIALS. Imperial Chemical Industries, Ltd. July 5. 19047.

DYESTUFF INTERMEDIATES, ETC. Imperial Chemical Industries, Ltd. July 7. 19230.

MANUFACTURE OF SULPHUR. J. Y. Johnson (*I. G. Farbenindustrie*). July 4. 18883.

DESTRUCTIVE HYDROGENATION OF DISTILLABLE CARBONACEOUS MATERIALS. J. Y. Johnson (*I. G. Farbenindustrie*). July 5. 18994.

LIQUID HYDROCARBON OILS. I. E. Lee. July 8. 19419.

DYESTUFF INTERMEDIATES, ETC. M. Mendoza. July 7. 19230.

PRODUCTION, ETC., OF METALLIC CATALYSTS FOR TREATMENT OF GUMS, ETC. W. W. Myddleton. July 7. 19217.

PREPARATION OF ADDITION COMPOUNDS. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. July 7. (Holland, July 25, '31.) 19215.

MANUFACTURE OF AMMONIUM SALTS. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. July 8. (United States, July 8, '31.) 19390.

DESTRUCTIVE HYDROGENATION OF DISTILLABLE CARBONACEOUS MATERIALS. H. E. Potts (*International Hydrogenation Patents Co.*). July 7. 19186.

BLEACHING ANIMAL FIBRES. Roessler and Hasslacher Chemical Co. July 6. (United States, July 7, '31.) 19136.

PRODUCTION OF 8-ZXY DERIVITIVES OF QUINOLINE. H. E. G. Rowley (*Riedel-E. de Haën Akt.-Ges.*). July 6. 19153.

MANUFACTURE OF CATALYST FROM CONVERSION OF TERPENES. Schering-Kahlbaum A.-G. July 5. (Germany, Nov. 25, '31.) 19035.

ELECTRICALLY PURIFYING GASES, NON-CONDUCTING LIQUIDS, ETC. Siemens-Schuckertwerke A.-G. July 7. 19247.

RESERVING FIBRES TO AZO-DYESTUFFS DEVELOPED FROM THEIR COMPONENTS. Society of Chemical Industry in Basle. July 8. (Switzerland, July 23, '31.) 19363.

RECOVERING THALLIUM. A. H. Stevens (*American Smelting and Refining Co.*). July 8. 19349.

BLEACHING AND REFINING PULP. C. B. Thorne. July 8. (Canada, May 3). 19412.

RECTIFICATION OF ALCOHOLS. Usines de Melle. July 6. (France, July 6, '31.) 19088.

LIQUID HYDROCARBON OILS. H. W. Walker. July 8. 19420.

Bacon. Feb. 25, 1930. 375,795.

Czechoslovak Match Industry

ALL Czechoslovak match plants reduced their output during the first quarter of 1932 and one factory at Susice was closed down entirely. The Czechoslovak exports of matches declined markedly in 1932 owing to import and currency exchange restrictions in many of its important markets.

From Week to Week

Mr. Kenneth H. Wilson has been elected a director of Bryant and May, Ltd., to fill the vacancy caused by the death of the late Rt. Hon. J. W. Wilson.

A London syndicate with a capital of £250,000 has secured an option on a gold-mining claim on the Molyneux River, New Zealand, and it is reported that the company intends to work the claim with two large dredges.

A slight error occurs in the article on "The Separation and Recovery of Copper and Nickel," published in The Chemical Age, July 2, Metallurgical Section, p. 3. For the maximum cobalt content of the nickel referred to in the last line but one, read 0.2 per cent. instead of 2 per cent.

New laboratories, built by the Hull Corporation for the city analyst's department were recently inspected by the Lord Mayor, Sheriffs and other members of the City Council. The visitors were received by the city analyst (Mr. A. R. Tankard). The building, which is at the corner of High Street and Alfred Gelder Street, replaces a "temporary" and inadequate laboratory in Lowgate, with which Mr. Tankard has had to be content since he came to Hull 23 years ago to open the department. The new building has cost £7,790 to erect, and the equipment, when complete, will have cost £1,400.

The Chilean Ambassador took part in private "conversations" in London on July 12 between representatives of the various interests in the Chilean nitrate industry. Instructions not to sign the proposed agreement were cabled by the Chilean Minister of Finance to the Chilean representatives at the conference. He warned the synthetic nitrate producers that unless Chile receives better terms than those offered, she will start "dumping" abroad her large reserve stock of natural nitrates. Chile is dissatisfied with the proposal of the synthetic producers for an agreed sale this year of 800,000 tons, which entails a reduction of the Chilean quota.

A preliminary programme has been issued of the ninth annual conference of the Association of Special Libraries and Information Bureaux, which is to be held at Somerville College, Oxford, from September 23 to 26. The proceedings will open with a reception of delegates on the evening of September 23, and the provisional list of speakers at the sessions on the two following days includes Sir Charles Sherrington, who will deliver his presidential address, Professor J. L. Myres, Dr. S. C. Bradford, Professor A. F. C. Pollard, Mr. S. S. Bullock, Mr. E. Carter, Mr. T. M. Herbert, Miss E. W. Parker, Mr. A. F. Ridley, Mr. A. S. Windett, Mr. H. L. Robinson, Professor M. Greenwood, Mr. J. P. Lamb, Mr. B. M. Headicar, Mr. C. Fuller, Mr. A. A. Eldridge and Mr. F W. Pethick-Lawrence.

A number of the men concerned in the dispute in the Yorkshire dyeing trade have returned to work. About 500 men employed by C. W. Wade, Low Mills, Rawdon, and Scott and Rhodes, Banksfield Mills, Yeadon, were concerned in the dispute which arose last week as the result of notice served on the men three months ago to terminate the present system of piece work. Both firms are members of the Leeds and District Worsted Dyers' and Finishers' Association. Discussing the settlement, Mr. Cyril Wade stated that so far as his firm was concerned the men terminated their employment, and the fact that they gave notice was entirely their own personal affair. The men had applied for reinstatement, but it had not been possible to take them all back. Some 35 per cent. of the men were still idle because there was not sufficient work for them. Mr. William Rhodes, of Scott and Rhodes, said some 10 per cent. of the men were still idle.

The valuable services which the British Cast Iron Research Association is able to render to the industry are likely to be considerably facilitated and improved by the extensions which were opened in Birmingham on July 6 by Lord Rutherford of Nelson, chairman of the Advisory Council of the Department of Scientific and Industrial Research and professor of experimental physics and director of the Cavendish Laboratory at Cambridge University. The formal opening was preceded by a luncheon held at the Queen's Hotel and presided over by Sir Harold Hartley, president of the association. In the course of his presidential address Sir Harold said the main research work of the association was directed towards solving the many problems which cast iron presented, and this had made notable progress. About five years ago it was found that various desirable investigations were hampered because they did not know sufficient about the combined effects of the numerous elements that might be present in cast iron. The influence of each normal element acting alone was fairly well understood, but of their conjoint influence much less was known. To do this work with metallurgical completeness would occupy many years of the time of an army of metallurgists provided with much greater facilities than they had at their disposal. For the immediate practical purposes of the industry, however, this programme of work has now virtually been completed.

Mr. Samuel Henshaw has been elected a director of the Staveley Coal and Iron Co., Ltd., to fill the vacancy caused by the death of Mr. L. N. Barrow.

The Texas Railroad Commission is planning a new cut in allowable output of oil per well in East Texas, as production has risen above 325,000 barrels daily, on account of the completion of new wells.

Abstracts of scientific and technical publications which have been published by the Massachusetts Institute of Technology semi-annually in January and July have been discontinued. The last publication, "Number 9," was issued in January, 1932.

Dr. O. B. Westcott, a student in the chemical department of University College, Exeter, who has been awarded an Otto Beit Fellowship, of the value of £240 per annum, tenable in the first instance for one year at the Imperial College of Science and Technology, London, will work there on the electro-deposition of tin, under the supervision of Sir Harold Carpenter. Dr. Westcott received his early scientific training at Hele's School, Exeter, and entered the University College in 1927 as a Sir Charles Cottier scholar and senior Exeter City scholar.

The Research Council of Alberta reports a discovery which will cheapen the extraction of oil or bitumen from the McMurray tar sands. For some years research has been carried on into methods of separating oil from these bituminous sands which are a very extensive resource in the Athabaska Valley, Northern Alberta. The investigators, Dr. K. A. Clark and Dr. D. S. Pasternack, now report that practically 100 per cent. of the oil or bitumen can be recovered by using a solution of soda ash. Bituminous sand separation by hot water is very simple and depends on neutralising the acid in the sand by the addition of a suitable alkali. Soda ash has been found to be the proper chemical to use and incidentally, is much cheaper than sodium silicate, which was used previously.

The nominal capital of I.C.I. Metals, Ltd., has been increased by the addition of £3,453,000 in £1 ordinary shares beyond the registered capital of £1,000,000. This increase is for the purpose of acquiring the whole of the issued share capital of Elliott's Metal Co., Ltd., British Copper Manufacturers, Ltd., Allen Everitt and Sons, Ltd., John Marston, Ltd., and Excelsior Motor Radiator Co., Ltd. All these companies are subsidiaries of Imperial Chemical Industries, Ltd., and this step, together with the formation, in April last, of I.C.I. Explosives, Ltd. (to acquire the capitals of 12 other subsidiaries), is doubtless a development of the policy outlined by Sir Harry McGowan at the last meeting of the parent company. Sir Harry said that in time the number of subsidiary companies in this country would be much reduced.

The question of industrial standardisation will again come before the Imperial Conference when it meets in Ottawa next week. On this occasion Mr. C. le Maistre, Director of the British Standards Institution, has been appointed adviser to the United Kingdom delegation on British standards. It will be recalled that at the last two Imperial Conferences very great importance was attached to the development of inter-Empire standardisation, and to the preparation of national industrial specifications by the national standardising bodies in each of the constituent parts of the British Commonwealth. Since last November, Mr. le Maistre has been touring the Dominions in connection with the development of this work, and there can be little doubt that the decisions taken at Ottawa are likely to lead to very substantial benefits to industry.

Obituary

Sir Richard Threlfall, F.R.S., in his 70th year. Sir Richard was by profession a consulting engineer, but his profound scientific knowledge and inventive genius was placed at the disposal of his country, both in time of peace and war, in a variety of capacities. Born at Hollowforth, near Preston, he was educated at Clifton, Caius College, Cambridge and Strassburg University. He became professor of physics at the University of Sydney, New South Wales, in 1886, and a few years later was appointed president of the New South Wales Royal Commission on the loading and carriage of coal at sea. He returned to England in 1890 and took up the position of director of Albright and Wilson, chemical manufacturers, of Oldbury, an appointment he retained to the time of his death. In 1905 he was elected chairman of the Royal Commission on the spontaneous combustion of coal in ships. He was a member of the Department of Scientific and Industrial Research, and the Chemical Warfare Committee; was formerly chairman of the Board of Fuel Research; and at the time of his death, chairman of the Chemistry Co-ordination Board. An honorary fellow of Caius College, Cambridge, fellow of the Chemical Society, and a fellow of the Royal Society, he published many papers on physical and chemical subjects and a book on "Laboratory Arts." He was awarded the medal of the Society of Chemical Industry in 1929 in recognition of his services for the development of industry on scientific lines.

Chemical Trade Inquiries

Abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

British India.—A Parsi firm of general importers and manufacturers' representatives in Bombay desires to represent United Kingdom firms for paints, varnishes, etc., for the Bombay Presidency, including Sind. (Ref. No. 26.)

British West Indies.—A firm of general merchants and commission agents in Port of Spain desires to obtain representation for Trinidad only of United Kingdom manufacturers of fertilisers (sulphate of ammonia and potash). (Ref. No. 31.)

New Zealand.—An agent at Wellington, at present in this country, desires to secure the agency for the whole Dominion, of United Kingdom manufacturers of soaps, perfumes and general toilet preparations. (Ref. No. 41.)

British West Indies.—A firm of commission agents at Kingston desires to obtain representation of United Kingdom manufacturers of automobile wax polish. (Ref. No. 32.)

Holland.—An agent at Scheveningen desires to get into touch with United Kingdom manufacturers of patent medicines and cosmetic specialities with a view to representing them. (Ref. No. 53.)

China.—An Englishman with long experience of China, at present in the United Kingdom, proposes to establish himself at Shanghai as a resident manufacturers' representative, and desires agencies of United Kingdom manufacturers of paints, varnishes, colours, etc. (Ref. No. 58.)

Syria (Damascus).—A firm of commission agents desires to represent United Kingdom exporters of sugar in the Damascus market. (Ref. No. 60.)

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